

Designing a
ONE-STOP-SHOP
for consumer renewable
energy systems



**CONSUMERS
INTERNATIONAL**
COMING TOGETHER
FOR CHANGE

ABOUT CONSUMERS INTERNATIONAL

Consumers International is the membership organisation for consumer groups around the world.

We believe in a world where everyone has access to safe and sustainable goods and services. We bring together over 200 member organisations in more than 100 countries to empower and champion the rights of consumers everywhere.

We are their voice in international policy-making forums and the global marketplace to ensure they are treated safely, fairly, and honestly. We are resolutely independent, unconstrained by businesses or political parties. We work in partnership and exercise our influence with integrity, tenacity, and passion to deliver tangible results.



Integrate to Zero is a not-for-profit philanthropic global initiative bringing together civil society, governments, and businesses to make on-site, on-road, on-grid consumer renewable energy systems fast, fair, and flexible. Together with our partners we provide advice, support deployment, and advocate for change to deliver a better deal to consumers across the world.

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EXECUTIVE SUMMARY

CONTEXT

The role of consumers in energy systems is changing. Consumers can now generate, use, store, and share renewable energy using common and increasingly affordable technologies. Empowering households to directly adopt these solutions can be a win-win-win, delivering faster climate action, lower bills, and more resilient grids. These gains are even greater when these technologies are combined on-site, on-road, and on-grid into an integrated **consumer renewable energy system.**

Consumers need help on several fronts to be able to adopt these systems. First, they need to know who is offering what in a complex landscape, how they will benefit, and how credible different providers are. Second, they need support to purchase and install the relevant technology assets, such as solar panels, batteries, smart meters, and electric heating, cooling, and vehicles. Third, consumers need help to access and operate the software solutions that integrate and optimise the system, and access to tariffs and offers that unlock the full stack of cost savings and revenue generation opportunities.

As consumer advocates, we want to see consumers supported along their whole journey, from initial awareness, to investment, to use. We want consumers to be supported to find the best deals in a complex and fragmented marketplace. And we want consumers to be able to trust the solutions they adopt and the suppliers they engage.

An interesting development in recent years is the growth of initiatives claiming to offer a **one-stop-shop service** for consumers. Typically, these might offer information on available solutions, provide technical, legal, and financial advice, facilitate access to affordable financing, coordinate installation and contracting, and take responsibility for system

monitoring as well as maintenance, repair, and consumer redress.

In recent years and in certain regions, the one-stop-shop concept has been promoted to support consumers through costly and complex building renovations. It is a broad category encompassing independent consumer advisory services and a range of business models. One-stop-shops have been established by public bodies, by consumer advocacy organisations, and by private actors from utilities to software companies to microfinance institutions. All varieties of one-stop-shops alike offer consumers support **across more than one stage of their journey, and across several products and services.**

Beyond building renovation, one-stop-shops may have the potential to make consumer renewable energy systems attractive and accessible to many more consumers, across different contexts. Independent advisory one-stop-shops hosted by governments or consumer organisations play a key role in raising consumer awareness, orienting them towards the best solutions, and building confidence in the marketplace. Commercial one-stop-shops can transform a complex and burdensome set of decisions and actions by non-expert consumers into a streamlined, single-entry proposition.

This report highlights what is happening globally, how consumers might benefit, and the lessons and points for exploration as we build a better marketplace for all.

KEY INSIGHTS

One-stop-shops are now a global phenomenon and developing fast, driven by digitalisation and growing consumer demand. They are increasingly branching out beyond building renovation to other consumer use cases such as residential solar photovoltaics and battery storage, efficient electrified heating and cooling, and smart system optimisation. They have found niches in markets at different stages of policy development and with different levels of solar generation potential.

Our global market scan uncovered **113 one-stop-shops**, which fall into five main types:

- 1. Advisory** one-stop-shops whose primary function is to raise consumer awareness and provide tailored advice.
- 2. Coordination** one-stop-shops that organise existing market actors, for example through an online marketplace, a software platform, or a collective purchasing scheme.
- 3. Pay-install-own** one-stop-shops, which offer a holistic commercial package to households that want to purchase and install technologies. The consumer signs a contract with the one-stop-shop, which bears responsibility for the results of the installation.
- 4. As-a-service** one-stop-shops which offer a holistic commercial package to households that want to install and use technologies without the need for an up-front purchase. The one-stop-shop bears responsibility for monitoring, maintenance, and repair as well as installation.
- 5. Integrated energy supply** one-stop-shops also bear responsibility for the household's grid-connected electricity supply, or for the payment of the electricity bill.

Our in-depth case studies of 11 leading one-stop-shops uncovered positive developments around affordability, trust, and simplicity for consumers. This is particularly strong in case studies which leverage **three unique capacities** of the model:

- 1. Coordination.** One-stop-shops stand at the centre of a disarticulated stakeholder map, generating a consistent project pipeline for suppliers and facilitating cooperation between different marketplace actors, from installers to banks to grant-making agencies.
- 2. Accreditation.** One-stop-shops secure consumer confidence through product testing, accrediting installers, and setting stringent contractual requirements. A one-stop-shop accreditation of installation works can also help to unlock financing for consumers.
- 3. Aggregation.** One-stop-shops leverage the aggregated demand of their consumers to unlock economies of scale and streamline access to finance for consumers.

Some real issues with the model were raised in our analysis, which must be solved to ensure that fundamental consumer rights are met, including protection of consumers' economic interests and consumers' data privacy and security. Leading one-stop-shops demonstrated innovative ways to meet **two unique challenges**:

- 1. Narrowing market choice.** By predefining a selection of products and suppliers on behalf of consumers, one-stop-shops restrict consumer choice to a small portion of the whole market. One-stop-shops can ensure competition by simulating informed consumer choice in their own selections, or by building a bidding mechanism directly into the consumer journey.
- 2. Additional costs of intermediary.** One-stop-shops must factor in the additional costs of coordinating stakeholders and offering support at every stage, without undermining consumer cost savings or adding friction to the consumer journey.

RECOMMENDATIONS

One-stop-shops can transform the marketplace, supporting consumers through their journey and acting as a bridge between a fragmented supply and a fragmented demand. At scale, they have the potential to activate tipping points and accelerate the transition to zero emissions.

To unlock this change, we are calling on national policymakers to:

- 1. Conduct a review** to understand consumer needs and market readiness regarding consumer renewable systems, to feed into an overall strategy and pathway to empower consumers through the energy transition.
- 2. Establish or directly fund public or NGO-run one-stop-shops** that deliver the greatest value to consumers and that private actors are unlikely or unable to provide.
- 3. Indirectly support commercial one-stop-shop services** through promotion and the provision of open-source software tools that can improve the consumer experience.
- 4. Design technology subsidy and electricity pricing regimes** in a way that incentivises one-stop-shops and their consumers to offer and adopt integrated consumer renewable systems.

Existing one-stop-shop services should review the best practices in this report and consider how they can strengthen their services by making the consumer journey more **streamlined, trustworthy, and affordable**. Consumer rights and needs should be upheld around key issues such as interoperability, data security and privacy, and redress. One-stop-shops should explore new opportunities to enhance the consumer experience.

A WAY FORWARD

To advance the innovation, insight, and cross-cutting collaborations we need, Consumers International will continue to build the consumer journey in the energy transition including exploring effective business models and policy recommendations. Join us to transform energy systems with and for consumers.

NOTE ON METHODOLOGY

The research underpinning the report and its recommendations included:

- A **literature review**, which analysed the barriers faced by consumers in different energy technology installation journeys, consumer behavioural insights, consumer protection considerations, and conditions to scale.
- A **global market scan** which uncovered and analysed 113 one-stop-shop services that integrate advice, products, and support into a single, streamlined offering for consumers.
- An **online survey** of national consumer organisations, to identify country conditions and differing market readiness. The survey was responded to by 30 consumer organisations across 28 countries (six in Europe, seven in Asia, six in Africa, four in South America, three in North America, two in Oceania).
- **Interviews** with over 30 experts and practitioners, to uncover different perspectives on the design of one-stop-shops and major challenges, and to understand in-depth 11 case studies.
- A **global index** assessing countries' readiness to integrate consumer renewable systems, drawing on desk research and quantitative data from secondary sources.

The approach and recommendations in this report are informed by a commitment to consumer protection and empowerment principles, established at the international level by the United Nations Guidelines for Consumer Protection.



SECTION 1: CONSUMER RENEWABLE ENERGY SYSTEMS

THE CONSUMER ENERGY REVOLUTION

The need for a different type of energy system has never been more apparent. 2022 saw consumers around the world facing unprecedented rises in their energy bills, linked to fossil fuel dependence and Russia's invasion of Ukraine. 90% of consumer advocacy experts around the world reported increasing energy prices for consumers over the

course of 2022, with a fifth reporting the price more than doubling.¹ The current system's toll on the planet is equally stark: the supply and use of energy produces around three-quarters of global greenhouse gas emissions today.²

Faced with soaring bills, many consumers have taken matters into their own hands. Consumers are purchasing cheap solar photovoltaics (PV) to become

'prosumers' – producers as well as consumers of energy. In 2022, 36 million households globally installed solar PV to power their needs – a 49% increase of the world's total rooftop solar capacity.³ As a result, the combined peak output of rooftop solar is now higher than combined peak consumption of France and Britain.⁴

Consumers are also installing on-site energy storage, electrifying how they heat and cool their homes, and switching to electric vehicles. Household spending on climate mitigation reached USD 184 billion in 2021/2022, a 340% increase on the previous year, and almost double the sum of all government spending on climate globally.⁵ This is driven mainly by rising global electric vehicle purchases, followed by residential solar PV, solar water heaters, and energy efficiency related home improvements. Using digital technologies, these climate mitigating assets can be integrated on-site into a single, smart system, allowing consumers to generate, use, store, save, and share energy with ease. These systems link up buildings with transport and the grid, with energy flowing

bi-directionally, responding to price signals in real time. As a result, consumers can not only save money on their bills from improved energy efficiency, but also unlock new revenue streams: 83 countries now have feed-in-tariffs which pay consumers a premium for exporting energy to the grid,⁶ and in 40 countries

¹ Consumers International (2022). *Global Member Insights Survey 2022*.
² International Energy Agency (2021) *Net zero by 2050: a roadmap for the global energy sector*. Available at: https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroBy2050-ARoadmapfortheGlobalEnergySector_CORR.pdf.
³ Solar Power Europe (2022). *Global Solar Market Outlook 2023-2027*. Available at: <https://www.solarpowereurope.org/insights/market-outlooks/global-market-outlook-for-solar-power-2023-2027-1>.
⁴ International Energy Agency (2022). *Unlocking the Potential of Distributed Energy Resources Power system opportunities and best practices*. Available at: https://iea.blob.core.windows.net/assets/3520710c-c828-4001-911c-ae78b645ce67/UnlockingthePotentialofDERs_Powersystemopportunitiesandbestpractices.pdf.
⁵ Climate Policy Initiative (2023). *Global Landscape of Climate Finance 2023*. Available at: <https://www.climatepolicyinitiative.org/wp-content/uploads/2023/11/Global-Landscape-of-Climate-Finance-2023.pdf>.
⁶ REN21 (2023). *Renewables 2023: Global Status Report*. Available at: https://www.ren21.net/wp-content/uploads/2019/05/GSR2023_GlobalOverview_Full_Report_with_endnotes_web.pdf.

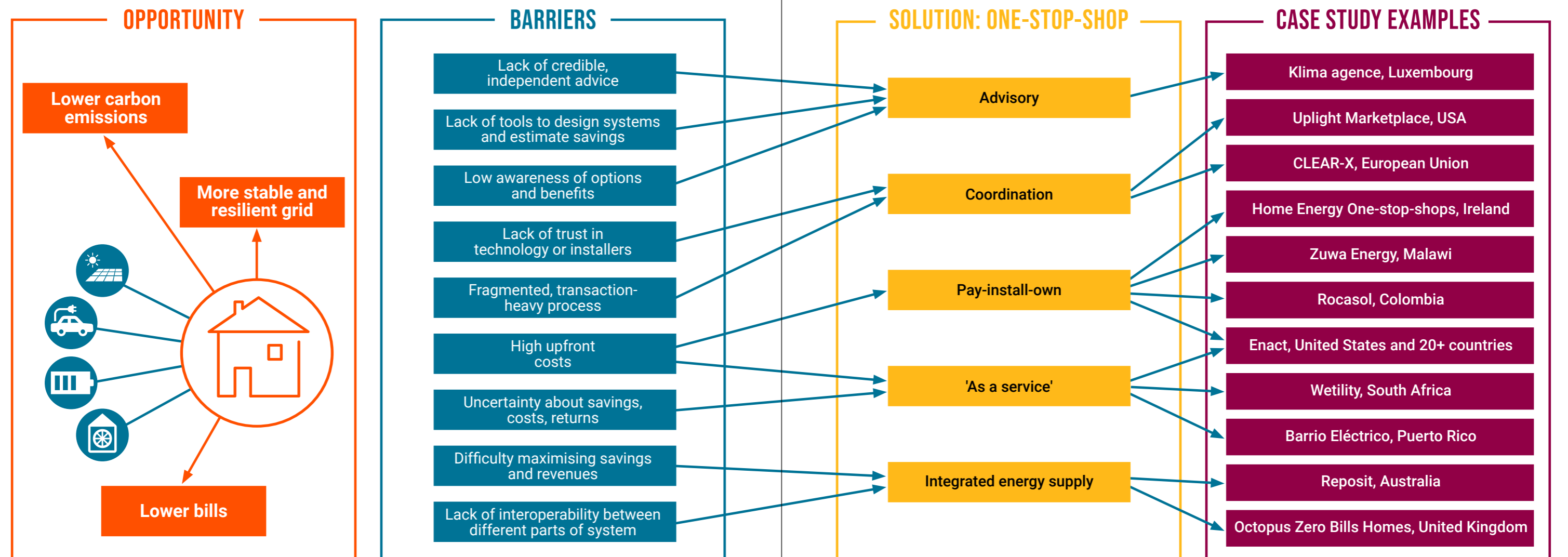


Figure 1. Summary of the report's key findings

consumers can gain from providing much-needed flexibility to the system.⁷ As a collective, these consumers are part of a shift towards a different type of energy system.⁸ Consumers are disrupting the traditional command and control model, dependent on centralised fossil-fuelled power plants, with a myriad

of distributed and integrated renewable energy systems. As illustrated in **Figure 2**, with the right help consumers can take a more active role in this emerging new energy system as designers, producers, and traders as well as users.

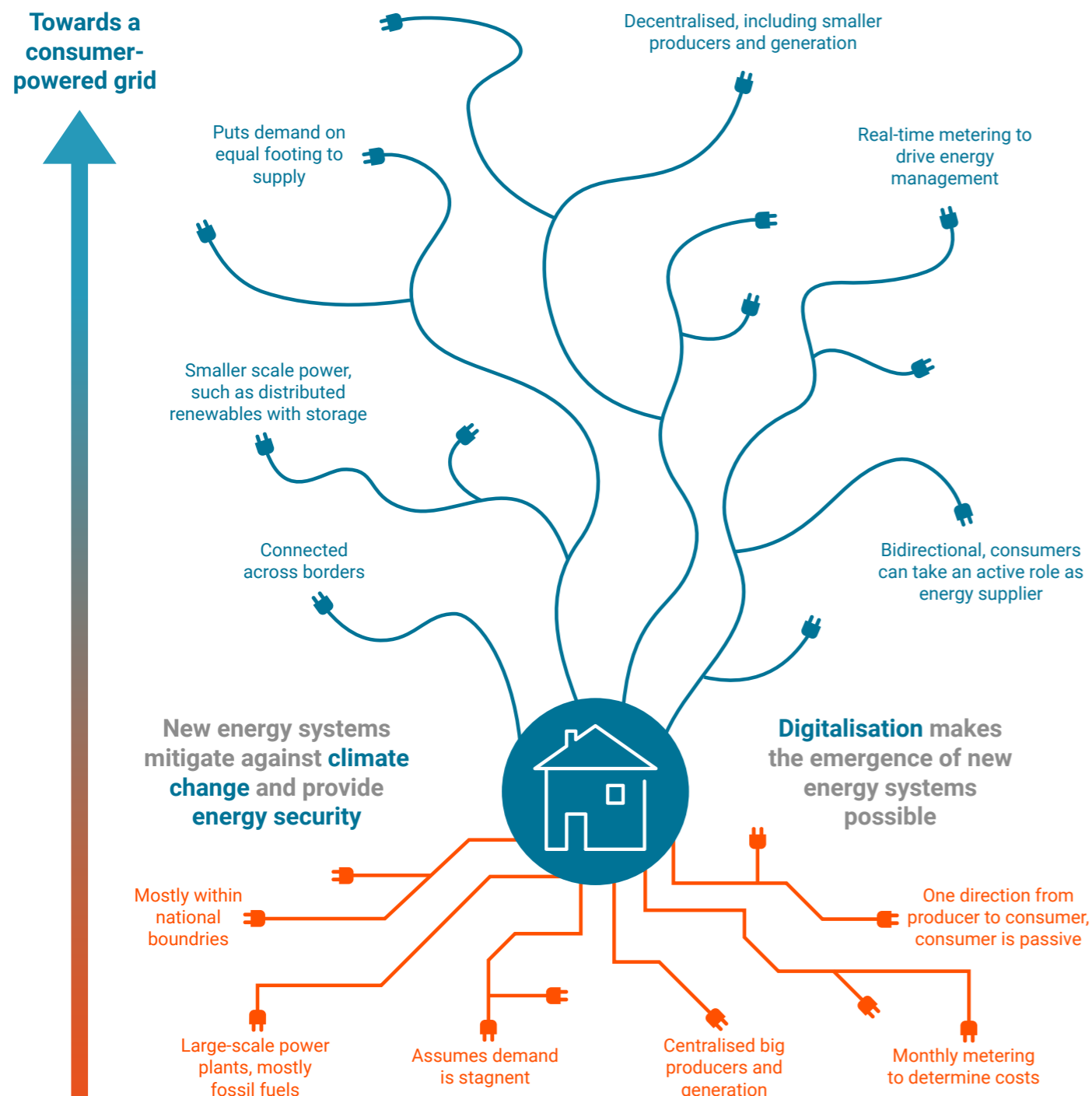


Figure 2. Consumers taking a more active role in the emerging energy system.⁹

⁷ Consumers International (2023). *Building the stack: how consumers can benefit from integrated renewable energy systems*. Available at: <https://www.consumersinternational.org/news-resources/blog/posts/building-the-stack-how-consumers-can-benefit-from-integrated-renewable-energy-systems/>

⁸ Sekarintias, A & Gross, L (2023). *Making a new generation of energy systems happen*. Available at: <https://www.e3g.org/publications/making-a-new-generation-of-energy-systems-happen/>

⁹ Adapted and modified from E3G (2023) *Briefing: New Generation Energy System*; Carbon Neutral Cities Alliance, (2016) *Energy System Transformation Playbook*; Aryblia et al.(2018), *Energy Atlas 2018*; Sokona et al., (2023), *Just Transition: A Climate, Energy and Development Vision for Africa*; Integrate to Zero (2022) *A blueprint for integrating clean energy*.

Integrated consumer renewable energy systems have the potential to deliver a win-win-win for individuals' finances, the environment, and energy security - all three pillars of the energy trilemma. This can be broken down into the benefits from generation, efficiency, and flexibility:

- **Scaling renewable generation at speed.** Rooftop solar can rapidly accelerate renewable generation capacity, preventing the need for investment in grid-scale renewables, which typically face greater social resistance¹⁰ and use more land.¹¹ According to the International Energy Agency, to meet net zero emissions by 2050, the number of households with rooftop solar PV needs to quadruple by 2030.¹² Consumers benefit financially by being able to tap into limitless solar energy at a zero marginal cost over the lifetime of the system. Power network resiliency is enhanced, and net losses avoided due to the proximity between generation and consumption.
- **A step-change in efficiency.** Efficient electric appliances – for example for home heating and cooling – can 'reduce electricity demand for typical energy services by up to two-thirds'.¹³ As a result, consumers can save substantially on running costs. Moreover, by reducing overall demand, efficiency reduces the cost of building the renewable supply system, enabling decarbonisation at lower cost. Lower overall demand also reduces the need for fossil fuel imports, enhancing energy security.
- **Activating demand-side flexibility.** Demand-side flexibility increases overall system efficiency by smoothing demand peaks, reducing the need to build and use (mainly gas-fired) power stations that are only required to meet peak demand. In Europe, it is estimated that fully unlocking demand-side flexibility by 2030 would save three billion euros annually in avoided peak generation capacity. This

¹⁰ Jarvis, S. (2022). *The economic costs of NIMBYism: Evidence from renewable energy projects*. https://stephenjarvis.github.io/files/jarvis_jmp_nimbyism_renewable_energy.pdf

¹¹ van de Ven, D.-J., Capellan-Peréz, I., Arto, I., Cazcarro, I., de Castro, C., Patel, P., & Gonzalez-Eguino, M. (2021). *The potential land requirements and related land use change emissions of solar energy*. *Scientific Reports*, 11, 2907. <https://www.nature.com/articles/s41598-021-82042-5>

¹² International Energy Agency (2022). *Approximately 100 million households rely on rooftop solar PV by 2030*. Available at: <https://www.iea.org/reports/approximately-100-million-households-rely-on-rooftop-solar-pv-by-2030>

¹³ IEA., IRENA., UN., World Bank., & WHO. (2022) *Tracking SDG7: the energy progress report*. Available at: https://mc-cd8320d4-36a1-40ac-83cc-3389-cdn-endpoint.azureedge.net/-/media/Files/IRENA/Agency/Publication/2023/Jun/Tracking_SDG7_energy_progress_2023.pdf?rev=f937758f92a74ab7ac48ff5e8842780a

makes decarbonising grids possible quicker and at lower cost: by 2030 demand-side flexibility in Europe could save 37.5 million tonnes (Mt) in annual greenhouse gas emissions.¹⁴ Consumers also benefit directly from financial rewards as well as indirectly via lower system costs. Security of supply during the highest demand peaks is provided via load shifting or curtailment.

BUILDING THE CONSUMER SAVINGS STACK

Distributed energy resources (DERs) – such as rooftop solar PV, stationary batteries, heat pumps, water-heaters, electric vehicles, and charge-points – can deliver greater gains for consumers when combined using smart digital technology into a single, integrated system.

These gains can be quantified by conceptualising a 'stack' of savings and revenues that consumers receive from their system. The concept of 'revenue stacking' has been set out in academic literature as a way for energy storage systems to maximise value of participating in multiple markets simultaneously.¹⁵ From the consumer perspective, this concept can be applied much more broadly, to identify and quantify the savings and revenues a household can unlock from renewable systems.

The most technologically advanced consumer renewable systems have a growing stack of cost saving and revenue generation opportunities, especially in countries which grant them high levels of market access:

1. Most consumers can unlock savings by making energy efficiency improvements, whether for appliances or a building's thermal envelope. A home retrofit that does both together can enable energy savings of 20% to 30%.¹⁶

¹⁴ SmartEn (2022). *Demand-side flexibility: quantification of benefits in the EU*. Available at: https://smarten.eu/wp-content/uploads/2022/09/SmartEN-DSF-benefits-2030-Report_DIGITAL.pdf

¹⁵ Schmidt, O. and Staffell, I. (2023). *Monetizing Energy Storage A toolkit to assess future cost and value*. Oxford: Oxford University Press. Available at: <https://global.oup.com/academic/product/monetizing-energy-storage-9780192888174>

¹⁶ International Energy Agency (2021). *A call to action on efficient and smart appliances*. Available at: <https://www.iea.org/articles/a-call-to-action-on-efficient-and-smart-appliances>

2. Consumers with on-site generation (typically rooftop solar PV)¹⁷ save on their electricity bills by consuming electricity they have produced at home, at zero marginal cost. They can also generate revenues by exporting to the grid or selling energy to other consumers. In 2022, European households equipped with solar PV and heat pumps reportedly cut their energy bills by 84%.¹⁸
3. Consumers that install on-site energy storage (from stationary lithium batteries to water boilers to electric vehicles) can unlock further savings by maximising self-consumption from rooftop solar. They can also receive revenues for providing grid services such as frequency response, via an aggregator. For example, by activating a single, 300-litre water heater for flexibility, a Swiss company was able to demonstrate a consumer energy saving of around 10% annually.¹⁹ Unlocking revenues from household batteries providing grid services has enabled one company in Australia to offer consumers a guarantee of zero electricity bills for seven years (see Reposit Power case study). And consumers do not need to choose between using the battery to save on bills by maximising self-consumption and using it to raise revenues from electricity markets: consumers with solar and storage could save 20% of their electricity costs each year while still having 90% of their battery capacity available for other value streams.²⁰
4. Smart meters and home energy management systems unlock a cluster of opportunities, such as savings from shifting consumption on a time-of-use tariff. The greatest benefit is likely for those with an electric vehicle, typically the highest single electricity consuming activity within a household. By 2030, the average electric vehicle owner in Europe could save 176 euros a year on their energy bill from smart charging and vehicle-to-grid injections.²¹

For consumers, **physically and digitally integrating different technologies** into a secure, safe single system can expand the cost savings and revenue generation 'stack' in three main ways: first, by

maximising consumption of self-generated electricity; second, by increasing overall system efficiency and therefore overall demand; and third, by increasing the load that can be used flexibly. For example, in addition to contributing to savings from energy efficiency, insulating the building envelope means that a home's thermal mass can act as a form of storage. This could enable a smart heat pump to shift when it uses electricity to when the price is lower on a dynamic tariff, or to when rooftop solar can supply the power. Further revenues could be realised by actively offering flexibility into markets through an aggregator.

Not every part of the stack is available to every energy consumer, however. Much depends on a country's regulatory framework. Residential solar PV has been most popular in countries with favourable feed-in-tariffs or net metering regulations, while explicit flexibility has been popular in countries where markets are most open to aggregated flexible load, and implicit flexibility is most feasible in countries with a high level of electrification and strong price signals, for instance through dynamic price contracts. However, the integration of ever greater proportions of intermittent renewables to the grid means the need for increased flexibility is almost universal: with renewable supply dependent on weather conditions and with the demand for heating, cooling, and transportation liable to peak when renewables are not generating, storage and demand-side flexibility become increasingly important. It is likely that regulatory regimes will continue to expand market access for consumer DERs, and that the revenues consumers can unlock will increase.

Much also depends on a country's level of economic and technological development, in addition to the financial situation of individual consumers. However, thinking in systems can reveal opportunities that are appropriate to different consumer needs and contexts, many of which can start to generate revenue and savings very quickly, even in the absence of comprehensive grids or digitalisation.

For example, in previously unelectrified areas of rural sub-Saharan Africa, off-grid solar home systems can

¹⁷ Solar is generally a more practical renewable option for residential energy production than wind, given the former's higher production rate under most conditions, lower maintenance requirements, and higher adaptability to different sites (for example even where there is not a lot of open space).

¹⁸ Solar Power Europe (2023). *Solar Powers Heat 2023: How Solar PV empowers households to turn down fossil gas and save on energy bills*. Available at: <https://www.solarpowereurope.org/press-releases/new-report-solar-pv-heat-pump-combos-saved-europeans-up-to-84-on-household-energy-bills-in-2022>

¹⁹ SmartEn (2023). *Filling the gap: Quantifying the actual carbon and flexibility performance of buildings*. Available at: https://smarten.eu/wp-content/uploads/2022/05/FINAL_demonstration-trials-report.pdf

²⁰ Fitzgerald, G., Mandel, J., and Morris, J. (2015). *The Economics of Battery Energy Storage*. RMI. Available at: <https://rmi.org/insight/economics-battery-energy-storage/>

²¹ SmartEn (2022). *Demand-side flexibility: quantification of benefits in the EU*. Available at: https://smarten.eu/wp-content/uploads/2022/09/SmartEN-DSF-benefits-2030-Report_DIGITAL.pdf

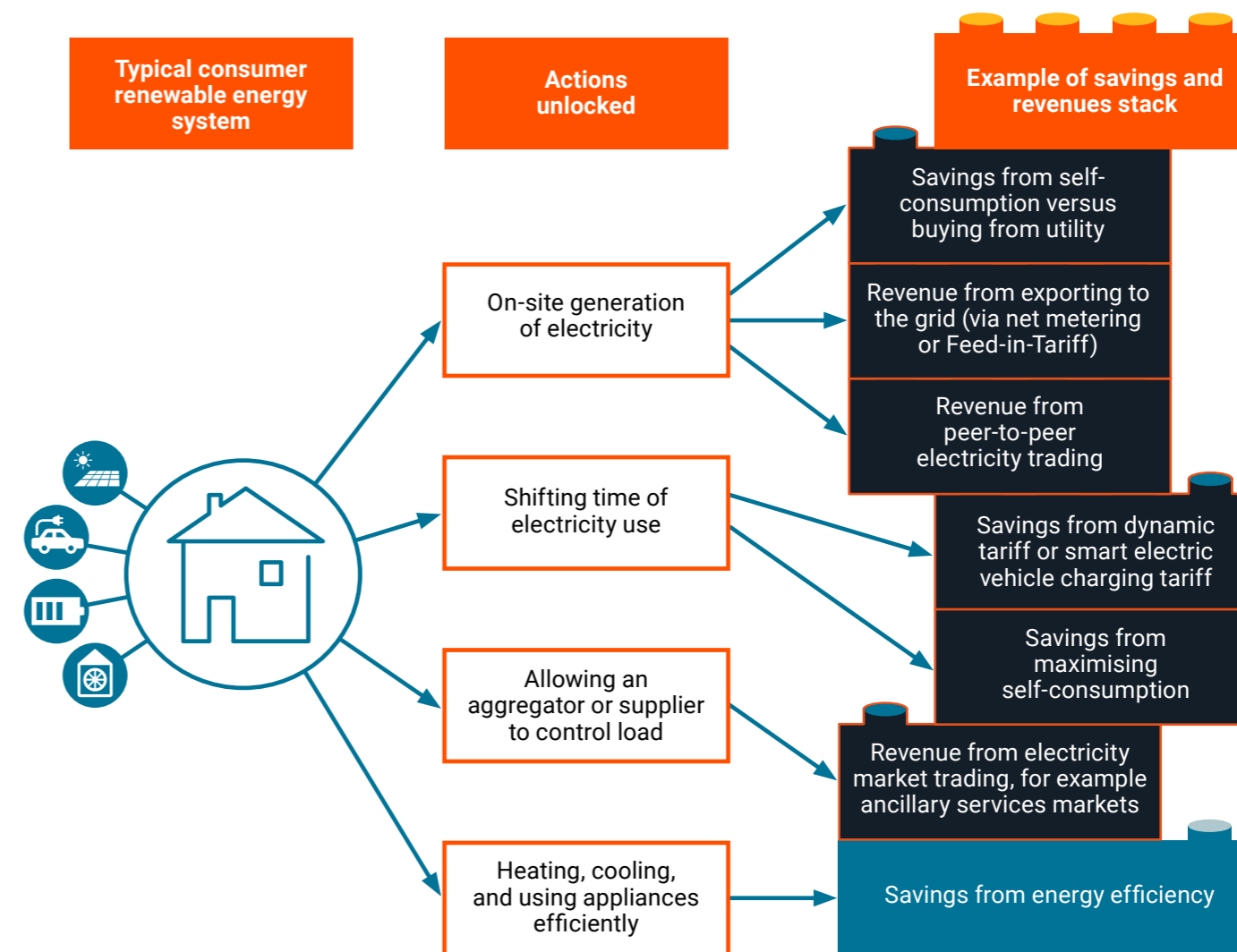


Figure 3. The consumer savings and revenue 'stack'.

dramatically reduce a household's energy expenditure whilst unlocking new economic opportunities, especially for women.²² The transition from kerosene and fuel-based lighting to off-grid solar technologies typically leads to savings of up to 85%.²³ Solar home systems also enable households to offer mobile phone charging services to neighbours, which in Kenya was shown to earn about 25 USD per month.²⁴ Off-grid electricity provides additional hours of lighting

for household members to undertake more economic activity: 29% of solar home system users spend more time working by shifting their tasks to the evening.²⁵ Off-grid solar electricity can also relieve women from burdensome activities, such as travelling long distances to collect or purchase solid fuels, and enables them to pursue additional productive activities.²⁶

²² Puranasamriddhi, A. and Parikh, D. (2021). *Off-Grid Energy and Economic Prosperity Evidence on the relationship between off-grid electricity access and local economic well-being in sub-Saharan Africa*. [online] Available at: https://www.ucl.ac.uk/bartlett/construction/sites/bartlett-construction/files/00impact_of_off-grid_in_ssa_report_final.pdf

²³ Lemaire, X. (2018). *Solar home systems and solar lanterns in rural areas of the Global South: What impact?* Wiley Interdisciplinary Reviews: Energy and Environment, 7(5). Available at: <https://wires.onlinelibrary.wiley.com/doi/abs/10.1002/wene.301>

²⁴ Opiyo, N.N. (2020). *How solar home systems temporally stimulate increasing power demands in rural households of Sub-Saharan Africa*. Energy Transitions. Available at: <https://link.springer.com/article/10.1007/s41825-020-00028-9>

²⁵ Nathan, A.J., Scobell, A. (2020) *Off-Grid Solar Market Trends Report 2020 Int. Financ. Corp.*, vol. 91, no. 5, p. 215, 2020. Available at: https://www.gogla.org/sites/default/files/resource_docs/2018_mtr_full_report_low-res_2018.01.15_final.pdf

²⁶ Fuso Nerini, F., Tomei, J., To, L.S., Bisaga, I., Parikh, P., Black, M., Borrión, A., Spataru, C., Castán Broto, V., Anandarajah, G., Milligan, B. and Mulugetta, Y. (2017). *Mapping synergies and trade-offs between energy and the Sustainable Development Goals*. Nature Energy. Available at: <https://www.nature.com/articles/s41560-017-0036-5>

A GLOBAL OPPORTUNITY

Across all contexts, consumers should be supported to access the savings and revenue opportunities made available by renewable systems. This is both a matter of essential consumer right and key to building consumer support throughout the transition to more distributed, flexible energy systems globally. There will be opportunities available to consumers in countries at different stages of energy systems' ongoing decentralisation and digitalisation. Interventions must understand the place- and context-specific make-up of the potential stack and design support for consumers accordingly.

As one approach to better understand these contexts, we have analysed each country's solar photovoltaic potential, as well as the offers and opportunities that are readily available for consumers with smart DERs in each market (net metering, feed-in-tariffs, dynamic price tariffs, explicit flexibility, and road-to-grid pilots).

Four categories emerged from this analysis:

1. Countries with a high rooftop PV potential but currently with few market opportunities for consumer systems. In these countries, consumers will likely benefit from the self-generation opportunities of rooftop solar but will struggle to build the full stack of possible revenue and savings opportunities.
2. Countries with a high rooftop PV potential where consumers can participate in several markets. These countries are the most promising for consumers to immediately benefit from building the full consumer renewable stack.
3. Countries with a low PV potential and few market opportunities for consumer renewables. Policy and regulatory changes are required in these countries before consumers can begin to benefit from the stack.
4. Countries with low PV potential but where consumers can participate in several markets. In these countries, consumers who build more

complex consumer renewable systems will be rewarded by the flexibility revenues they unlock even when sunlight is unreliable. Solar PV alone without storage or flexible load (such as a smart heat pump) is unlikely to deliver significant benefits to consumers in these countries.

Figure 4. Quadrant showing the stack readiness of key countries.



- Solar potential rated as Practical Potential Output from 2.51 to 5.38 kWh/kWp/day²⁷
- Smart DER opportunities rated from 0 to 5 according to availability of
 - 1) Feed-in-Tariffs²⁸
 - 2) Net-metering²⁹
 - 3) Vehicle-to-Grid projects
 - 4) Dynamic price tariffs
 - 5) Explicit demand-side flexibility.
- Note that the placement of countries is not exactly to scale.

Two key takeaways for the design of context-appropriate solutions can be drawn:

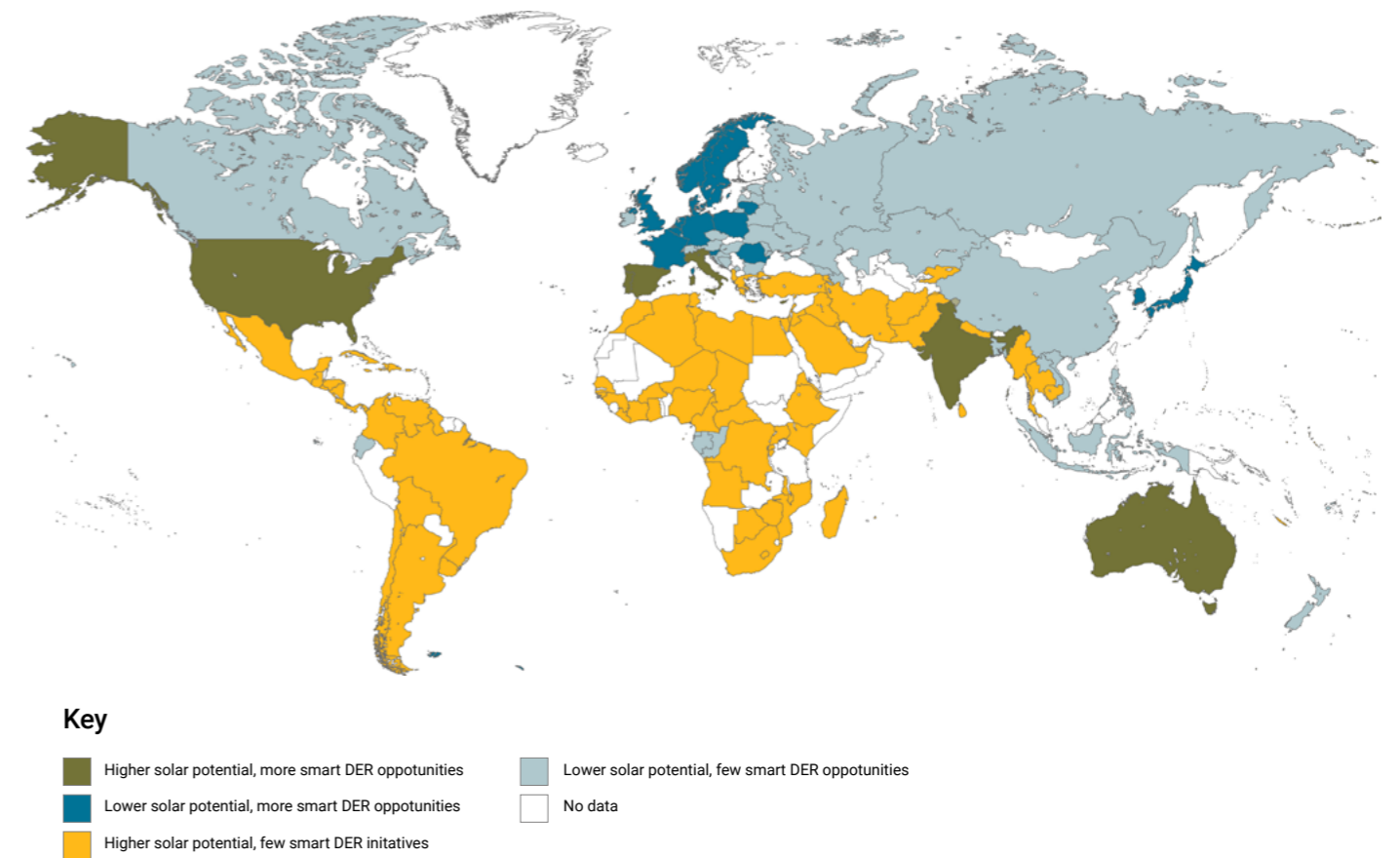
1. Where there is high solar PV potential, consumers can still receive significant financial returns from solutions even in the absence of smart DER opportunities (**yellow quadrant**). For example, in the United Arab Emirates consumers can make bill savings from installing solar and storage more than the typical repayment instalments (see Enact case study). In Malawi, consumers can save up to 85% by switching from fuel-based lighting to solar home systems (see Zuwa Energy case study).

²⁷ World Bank (2020). *Global Photovoltaic Power Potential by Country*. Data Catalog. Available at: <https://datacatalog.worldbank.org/search/dataset/0038379>.

²⁸ REN21 (2023). *Renewables 2023: Global Status Report*. Available at: https://www.ren21.net/wp-content/uploads/2019/05/GSR2023_GlobalOverview_Full_Report_with_endnotes_web.pdf

²⁹ *ibid*

Figure 5. Map illustrating the stack readiness of all countries.



2. In countries with many opportunities for smart DERs, consumer systems can benefit financially from providing flexibility as well as from efficiency and self-generation. Consumers in countries that also have high solar PV potential (**green quadrant**) will be able to unlock the same amount of flexibility with a smaller system, compared to countries with many smart DER opportunities but low solar PV potential (**blue quadrant**). For example, Reposit Power are able to offer a longer zero electricity bills guarantee to consumers in Australia than Octopus is able to offer to consumers in the United Kingdom – even though to participate in the latter's scheme, consumers need to have a fully electrified, smart heating load and a home with very good thermal characteristics, as opposed to a simple solar and battery installation (see Reposit Power and Octopus case studies).

³⁰ Consumers International (2023). *Global Member Survey, September 2023*.

³¹ *ibid*

BARRIERS FACED BY CONSUMERS



Despite the tangible and growing benefits of DERs for consumers, only a minority are currently realising this full opportunity. Consumers face common technological, infrastructural, financial, regulatory, and knowledge-related barriers. 80% of consumer experts from around the world reported that 'few' or 'very few' consumers in their country would be able to afford the suite of DERs needed to activate the full stack.³⁰ Two thirds of experts said that even if consumers could afford the technologies, they would find it difficult to integrate them into a single, optimised system.³¹ To unpack the various barriers faced by consumers, it is necessary to examine every stage of the consumer journey, from awareness to investment to use. A consumer's interactions with a product or service may begin positively, with easy to find information, advice, and financial support, but hit roadblocks post-purchase, for instance if warranties are inadequate or maintenance liabilities unclear. Accessing subsidies for rooftop solar PV is an illuminating example. According to our expert survey, solar PV is the easiest

clean energy technology for consumers to find quality advice about, and the best supported by government subsidies and grants. Yet 60% of consumer experts say that it is hard for consumers to access these incentives, whether due to an oversized administrative burden or due to the need to purchase the panels up-front before applying for the government support.³²





Designing and building an integrated renewable energy system is a challenging journey for households. It requires technical, engineering, administrative and legal knowledge and depends on the smooth collaboration with several specialised service providers, who may be difficult to identify and

deal with. There is a high chance of making mistakes. **Figure 6** provides a non-exhaustive and generalised overview of the risks and barriers faced by consumers at each stage of their purchase journey for common DERs. The table also outlines where DER integration adds further risks or barriers which do not arise when installing a standalone DER, such as a lack of interoperability. Often, however, integration can help to mitigate the barriers and risks of individual technologies: for example, by maximising returns and reducing transaction costs if purchased as a single bundle.

Figure 6. Matrix of typical barriers and risks faced by consumers at each stage in their purchase journey.

STAGE OF THE CONSUMER JOURNEY	BARRIERS AND RISKS FACED BY CONSUMERS	
 <p>AWARENESS AND UNDERSTANDING Consumers understand and trust opportunities for change.</p>	<ul style="list-style-type: none"> • Home building renovation • Solar PV and battery storage • Electrified heating and cooling (e.g. heat pumps) • Electric Vehicle charging 	<ul style="list-style-type: none"> • Integration into a Smart, flexible System
	<p>Lack of reliable and credible information on available solutions, and the precise costs and financial, comfort, and sustainability benefits.</p> <p>Insufficient independent technical advice on how best to approach and prioritise complex works.</p> <p>Cost and hassle of carrying out analysis such as a home energy audit and of planning multi-stage projects.</p> <p>Greenwashing – exaggerated or misguided claims from some suppliers – leading to consumer mistrust.</p> <p>Many and often contradictory sources of information on the topic, adding to consumer fears.</p>	<p>Low awareness and understanding of the benefits of integration.</p> <p>Lack of calculation tools that accurately predict savings.</p> <p>Lack of software tools to design a customised system.</p> <p>Insufficient digital literacy.</p> <p>Lack of trust in connected devices.</p>
	<p>Unavailability of safe or affordable technologies.</p> <p>Lack of trust in the quality and safety of technologies, especially in the absence of well-known standards.</p> <p>Hassle of gathering and comparing several quotes from installers.</p> <p>Site-specific barriers (e.g. roof not the right size or orientation).</p>	<p>Lack of integrated technology offers on the market.</p> <p>Limited smart meter penetration.</p> <p>Lack of enabling supply tariffs from utilities, such as dynamic pricing.</p> <p>Lack of market access for aggregated DERs.</p> <p>Lack of or insufficient price for export to the grid.</p>
 <p>AVAILABILITY OF AFFORDABLE AND ATTRACTIVE SOLUTIONS There are Affordable and Attractive options for consumers to choose.</p>		

³² ibid

 <p>INSTALLATION Consumers can install solutions with ease and without serious risks.</p>	<p>Need for large up-front investment.</p> <p>Absence of adequate incentive mechanisms from government (e.g. subsidies, tax credits, grants).</p> <p>Barriers to uptake of incentive mechanisms, such as a prohibitive administrative burden.</p> <p>Lack of dedicated financing schemes that recognise the financial risk mitigation offered by energy efficiency or by zero marginal cost energy generation.</p> <p>Unattractive financial returns on standalone technologies.</p>	<p>Uncertainty about returns, given dependence on electricity market structure.</p> <p>Lack of offers that give investment certainty like zero bill guarantees.</p> <p>Absence of incentive mechanisms (e.g. subsidies, tax credits) specifically for integration.</p>
 <p>INVESTMENT Consumers can access adequate financing or incentives to purchase.</p>	<p>Barriers related to tenancy or ownership rights.</p> <p>Complex or disruptive building or installation works.</p> <p>Prohibitive building regulations or planning permission requirements.</p> <p>Unavailability of qualified and trusted contractors or installers.</p> <p>Lengthy wait and high administrative burden for permitting and inspection.</p> <p>Interdependency of technologies with building energy performance (e.g. not renovating building first could actually increase bills).</p> <p>Higher transaction costs due to several individual investments to different suppliers.</p>	<p>Lack of interoperability between different parts of the system.</p>
 <p>USE Consumers can use new systems and technologies efficiently, safely, and effectively.</p>	<p>Difficulty matching consumption to size and intermittency of system output.</p> <p>Lack of understanding of how to use clean heating technologies efficiently and effectively.</p> <p>Need for consumers to adopt unfamiliar practices when they heat and cool their homes, and travel.</p> <p>Lack of understanding of how to monitor systems to check they are working correctly.</p> <p>Failure to realise expected energy savings leading to difficulties with loan repayment.</p>	<p>Inability to change use patterns to provide flexibility (e.g. vulnerable consumers who need continual energy supply).</p> <p>Risks surrounding data security and privacy.</p> <p>Lack of advice or active support to optimise the system and maximise revenue streams.</p> <p>Unwillingness to give up household data that will be sold by the managing organisation.</p>
 <p>MAINTENANCE, REPAIR, AND REDRESS Consumers are supported post-purchase and can access adequate maintenance, repair, and redress.</p>	<p>Lack of local supply chains for reliable ongoing maintenance and repair.</p> <p>Confusion around stakeholder liabilities.</p> <p>Lack of awareness of relevant complaints procedures.</p> <p>Inadequate or badly advertised warranties and insurance-backed guarantees.</p>	<p>Confusing set of different warranties.</p> <p>No company liable for realising promised integration gains (unless under bill guarantee).</p>



SECTION 2: THE ONE-STOP-SHOP MODEL

SUPPLYING COMPLEX PRODUCTS AND SYSTEMS

We need an abundance of interventions to empower consumers in clean energy transitions globally. To contribute to the removal of systemic barriers, interventions should be designed according to two linked objectives:

1. Interventions should support consumers and protect their rights **across the whole consumer journey**, from awareness to investment to use.
2. Interventions should support consumers **across all the different products and services** that are required to unlock the savings and revenue stack.

Creating new business models is a vital tool in the consumer systems change toolbox and historically has been instrumental to the diffusion of new technologies and systems.³³ One of the new models that could significantly accelerate the uptake of consumer renewable systems is the one-stop-shop. These can be understood broadly as solutions that offer support to consumers across more than one stage of the consumer journey, and across more than one product or service.

The one-stop-shop model is not free of risks or trade-offs but can be highly attractive from a consumer rights point of view. By supporting

consumers along their journey, one-stop-shops can make the consumer experience more streamlined and more trustworthy, assuaging consumers' fears about making substantial investments with uncertain returns. By supplying complex products and systems rather than individual products or services,³⁴ one-stop-shops can provide consumers with a more tailored, integrated offer.³⁵ This can unlock greater optionality for consumers, mitigate interoperability challenges, and enable consumers to sequence improvements in a cost-effective, risk-aware manner.

All consumer advocacy experts in our survey said that one-stop-shops have the potential to accelerate the clean energy transition in their country.³⁶ Moreover, consumer organisations from the Netherlands to Germany to India have established their own one-stop-shop advisory services for consumer home energy upgrades (see also the CLEAR-X case study below).

Consumers need to get access to one-stop-shops that are an integrated services' hub, where they can get one point of contact who guides them through the definition of their project, provides them with access to accredited and reliable installers, tailor-made financial offers and informs them about the most up-to-date materials and appliances – The European Consumer Organisation.³⁷

The one-stop-shop model has received policy attention in recent years in some regions, but for the

³³ Teece, D.J. (2010). *Business Models, Business Strategy and Innovation*. Long Range Planning, pp.172–194. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S002463010900051X>

³⁴ Slywotzky, A.J. (1996). *Value Migration: How to Think Several Moves Ahead of the Competition*. Harvard Business Review Press, Boston, MA; Sharma, D. and R. Molloy (1999). *The truth about customer solutions*. New York, NY, USA, Booz Allen & Hamilton; Davies, A., P. Tang, T. Brady, M. Hobday, H. Rush and D. Gann (2001). *Integrated Solutions: The new economy between manufacturing and services*. Brighton/London, UK, University of Brighton.

³⁵ Brady, T. and Davies, A. (2004). *Building Project Capabilities: From Exploratory to Exploitative Learning*. *Organization Studies*, 25(9), pp.1601–1621. Available at: <https://journals.sagepub.com/doi/10.1177/0170840604048002>

³⁶ Consumers International (2023). *Global Member Survey, September 2023*.

³⁷ BEUC (2021). *How to make one-stop-shops consumer-friendly*. Available at: <https://www.beuc.eu/position-papers/how-make-one-stop-shops-consumer-friendly>

limited use of supporting consumers to make building efficiency upgrades. Since 2016, European Member States have been called on by the European Commission 'to develop dedicated local or regional one-stop-shops for project developers, covering the whole customer journey from information, technical assistance, structuring and provision of financial support, to the monitoring of savings.'³⁸ This has led to a significant growth in the number of one-stop-shop solutions available for home renovations, with 61 integrated solution providers identified by the Commission in 2021.³⁹ Typically, however, these solutions only offer support for consumers to implement improvements in the energy performance of the building envelope: only 8% of one-stop-shop mapped by the European Commission include assistance for consumers to adopt clean heating or rooftop solar.

There is a missed opportunity to integrate all the elements of the consumer renewables stack into the design and implementation of one-stop-shops. This could lead to a much more streamlined consumer experience. The high fixed cost of the equipment (for example, heat pumps, solar panels, inverters, stationary batteries) also means that bundling together also reduces the marginal cost of a fully 'managed' service and increases the marginal benefits of combination. Moreover, the market for consumer renewable systems is often highly disarticulated. Even in mature markets where electric vehicles are price competitive, for example, it is rare that the seller of the vehicle will be able to help the consumer install a charge-point or take advantage of the best agile, smart charging electricity tariffs.

ONE-STOP-SHOP ACTIVITIES

We carried out a global market scan to understand the potential of one-stop-shops to empower consumers to design, build, and use integrated renewable systems. This spanned businesses (technology suppliers and installers, software platforms, utilities, advisory consultants, financial companies), civil society organizations (such as independent consumer

organisations) and public bodies (primarily municipalities and government agencies).

We identified 113 initiatives that could be classified as one-stop-shops due to their integration of individual products and services into a more complex, holistic offering that guides consumers through more than one stage of their journey. A breakdown of the countries and market types where the one-stop-shops identified are located can be found in Appendix 1. 34% of the initiatives are hosted by a private company, 35% by a not-for-profit organisation, 17% by a public body and the remainder by a hybrid such as a public-private partnership. The three main takeaways from analysis of the initiatives are:

1. There is a missed opportunity to support consumers implement the whole stack. Most of the one-stop-shops offer advice and support for more than one renewable energy technology, but less than 10% cover efficiency, solar, storage and clean heating at the same time.
2. Public bodies are active as one-stop-shop providers, but only in some regions. A large majority of the public sector initiatives are from the European region.
3. Consumers would still benefit from better guarantees and certainty. Less than 5% of the one-stop-shops in this global mapping guarantee a reduction in the household's use or spending on energy.

Despite the large variety of purposes and structures adopted by the one-stop-shops, certain activities were common. Figure 7 outlines the most common activities covered by one-stop-shops of different types and sizes. Figure 8 illustrates the number of one-stop-shops identified in our global mapping that provide consumers with support at each stage of their journey.

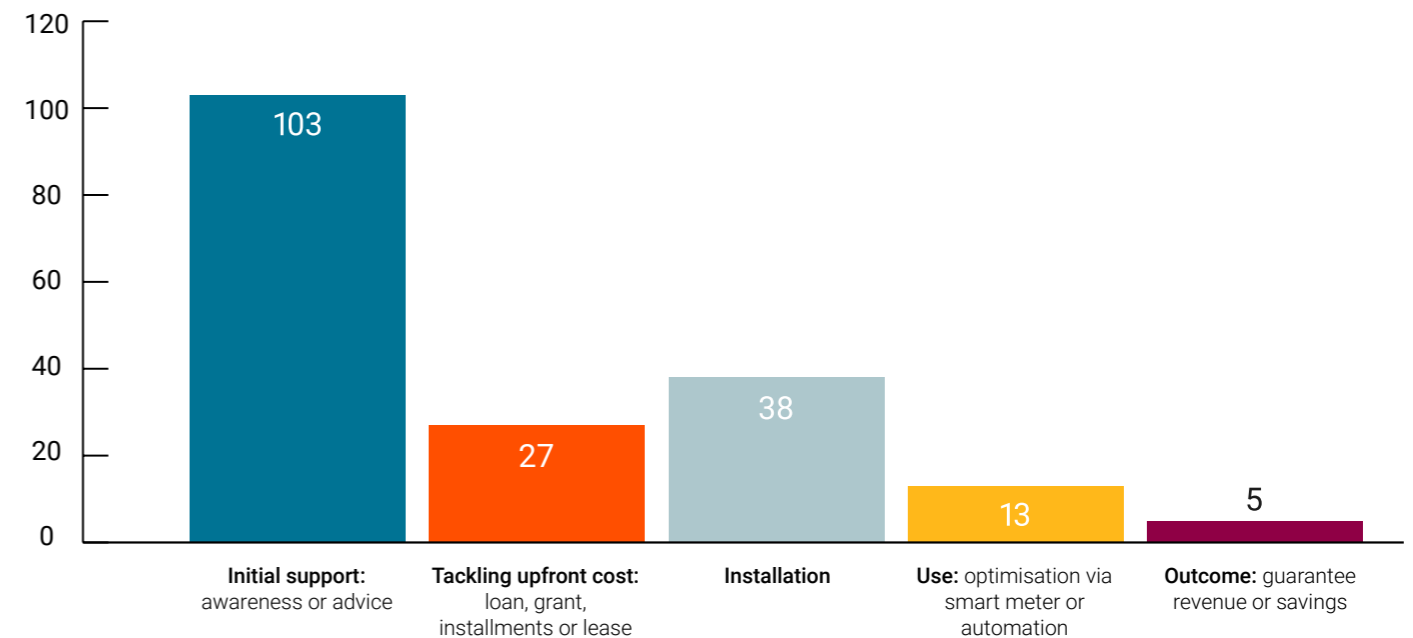
³⁸ European Commission (2019). *Clean energy for all Europeans package*. Available at: https://energy.ec.europa.eu/topics/energy-strategy/clean-energy-all-europeans-package_en

³⁹ Boza-Kiss, B., Bertoldi, P., Della, V.N. and Economidou, M. (2021). *One-stop shops for residential building energy renovation in the EU*. JRC Publications Repository. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC125380>

CONSUMER JOURNEY STAGE	RANGE OF ONE-STOP-SHOP ACTIVITIES
Awareness and understanding	<p>Awareness-raising of the benefits of consumer renewable systems.</p> <p>Customised recommendations of relevant measures and technologies.</p> <p>Provision of online calculators to estimate potential future financial or emissions savings.</p> <p>Preliminary analysis such as home energy audit.</p> <p>Development of a roadmap aiming at deep renovation.</p> <p>Recommend certified suppliers and installers.</p>
Availability of affordable and attractive solutions	<p>Bundling of different goods and services into an off-the-shelf product.</p> <p>Solicit competitive bids from qualified contractors and suppliers on behalf of the consumer.</p> <p>Product testing to ensure the solutions offered are of high quality and competitively priced.</p> <p>Collaboration with original equipment manufacturers to ensure products are interoperable and can be controlled using smart technology.</p>
Investment	<p>General advice on existing financing options for which the homeowner is eligible (subsidies, tax credits, energy efficiency certificates etc.)</p> <p>Application for rebates, grants, and incentives on behalf of consumer.</p> <p>Provide custom project documents, guarantees, or financial plans that a bank can use to evaluate the project quickly.</p> <p>Provision of own financial product or one negotiated partner financial institutions that considers achieved energy savings or from energy efficiency or zero marginal cost generation.</p> <p>Set-up of a local incentive schemes if one-stop-shop supported by local authorities e.g. a local revolving fund.</p>
Installation	<p>Coordination of different stages and actors involved in installation and quality control.</p> <p>Training of local suppliers to ensure the quality of installation.</p> <p>Accreditation of 'quality' suppliers and installers.</p> <p>Verification that the works have been carried out to the expected standard.</p>
Use	<p>Post-installation monitoring of system operation and efficiency.</p> <p>Interface to understand savings and consumption patterns e.g. a mobile app.</p> <p>Aggregate and trade flexibility products in electricity markets on behalf of consumers.</p>
Maintenance, repair, and redress	<p>Guarantee of results, savings, or quality.</p> <p>Follow-up on manufacturer warranties on behalf of consumers.</p> <p>Coordinate redress or complaints process on behalf of consumers.</p> <p>Take full responsibility for maintenance and repair, in the case of an as a service model.</p>

Figure 7. The common activities that one-stop-shops cover – ideally 'under one roof'.

Figure 8. Number of one-stop-shops offering support at each stage of the consumer journey.



A TYPOLOGY OF ONE-STOP-SHOPS

Given the breadth of activities carried out by the initiatives, and the variety of stakeholders involved, it can be difficult to understand the ways in which they each adapt the one-stop-shop model to meet consumer needs and navigate trade-offs. This is an issue for one-stop-shop practitioners, who want to understand global best practices and replicable innovations to enhance their offerings for consumers. It also raises challenges for policymakers, who want to understand and characterise the range of marketplace initiatives that exist and how policy can promote those that best support consumers and accelerate progress towards climate goals.

To meet this challenge, we have developed a **novel typology** to classify one-stop-shop initiatives, based on our global mapping. Drawing on the existing literature on one-stop-shops for building renovation, the main difference between these types is the level of

support provided by the one-stop-shop for the overall consumer journey, and the level of responsibility taken on by the one-stop-shop for the installation and operation of the system.⁴⁰ However, new distinctions are needed to grasp the range of approaches taken by one-stop-shops that serve the wider range of consumer technologies beyond buildings, from solar PV to storage to electric vehicles. Some one-stop-shops sell technologies outright, some rent technologies, and some take charge of a consumer's grid-supplied electricity – each with implications for the consumer journey and experience.

Figure 9 outlines the key characteristics of each type, their distinct roles, and typical providers and consumers. As you move from type one to five, the risk burden undertaken by the one-stop-shop on behalf of the consumer increases. Figure 10 describes the typical advantages and disadvantages of each type for consumers.

⁴⁰ See: Brown, D. (2018). *Business models for residential retrofit in the UK: a critical assessment of five key archetypes*. Energy Efficiency 11: 1497-1517; Ciemanova, J., Eisermann, M., Maraquin, T., 2020. *How to set up an OSS for integrated home energy renovation: a step-by-step guide for local authorities and other actors*. Available at: <https://energy-cities.eu/publication/how-to-set-up-a-one-stop-shop-for-integrated-home-energy-renovation/>; Pardalis, G., Mahapatra, K., Mainali, B. (2022). *Comparing public- and private-driven one-stop-shops for energy renovations of residential buildings in Europe*. Journal of Cleaner Production 365.

Figure 9. Five types of one-stop-shop, their roles and responsibilities, and typical providers and consumers.

ONE-STOP-SHOP MODEL	ROLES AND RESPONSIBILITIES	TYPICAL PROVIDER	IDEAL CONSUMER TYPE	CASE STUDY EXAMPLE
1. Advisory	Raise consumer awareness. Provide tailored advice. Recommend products and suppliers.	Government agency Civil society organisation Energy utility	Consumers at orientation stage who seek information. Motivated consumers who intend to organise purchases on their own.	Klima Agence
2. Coordination	Organise existing market actors, for example via an online marketplace, software platform, or collective purchasing scheme. Limited responsibility for the result of the installation.	Government agency Civil society organisation Energy utility	Consumers who seek some technical and financial support but want to retain ownership over their project.	CLEAR-X Uplight Marketplace
3. Pay-install-own	Offer a holistic package to households to purchase and install technologies. Bear responsibility for the result of the installation. Typically facilitate access to financing. Limited responsibility for maintenance and repair.	Installers. Microfinance institutions.	Consumers who seek assistance all along the installation journey. Consumers that can afford the up-front cost or can access financing.	Rocasol Zuwa Energy Republic of Ireland Enact
4. 'as a service'	Offer a holistic package to households to install and use technologies under a rental agreement. Bear responsibility for ongoing operation, maintenance, and repair as well as installation.	Diversifying installer business. Specialist non-profit organisation.	Consumers who seek assistance all along their journey, including post-purchase. Consumers who cannot afford to make up-front payment or easily access financing.	Barrio Eléctrico Wetility
5. Integrated energy supply	Bear responsibility for grid-connected energy supply or of the payment of the energy bill. Often make a time-limited guarantee of zero electricity bills. May offer some of the typical one-stop-shop installation services above.	Energy utility. Independent aggregator. Electricity market trader.	Consumers who want to have complete peace of mind are happy to give up a degree of control and data.	Octopus Zero Bills Homes Reposit Power

Figure 10. Typical advantages and disadvantages of different one-stop-shop types.

+	ADVISORY MODEL	-
<ul style="list-style-type: none"> Free of charge customised advice, often paid from public funds. Physical or online energy advisory desk. 	<ul style="list-style-type: none"> A potentially long list of suppliers or products with limited recommendation or guarantee of a good quality service. Householder must contact suppliers in different places (banks, installers etc) and sign and manage different contracts. Householder must apply for financing independently, coordinate the installation of different products, and manage the monitoring and follow-up. 	
+	COORDINATION MODEL	-
<ul style="list-style-type: none"> High guarantee of good quality products and services, due to one-stop-shop accreditation and filtering. Demand aggregation (for example through online marketplace or collective buying scheme) lowers up-front technology price. Assistance with the coordination of works (if provided) and access to financial assistance. 	<ul style="list-style-type: none"> Householders must sign and manage contracts with suppliers who are individually responsible for the products and services provided. Householders typically must get in touch with a bank or financial institution to apply for a financial product. Householders must deal with the follow-up of the installation and monitoring performance. 	
+	ALL-INCLUSIVE PAY-INSTALL-OWN MODEL	-
<ul style="list-style-type: none"> The one-stop-shop is a unique interface and the responsible body. One-stop-shop deals with suppliers and contractors. One-stop-shop guarantees the quality of installation and often helps to monitor ongoing performance. 	<ul style="list-style-type: none"> If the one-stop-shop does not offer its own financing, householders need to get it from other sources. No guarantee of bill savings and no ongoing maintenance and repair beyond warranties. 	
+	ALL-INCLUSIVE AS-A-SERVICE MODEL	-
<ul style="list-style-type: none"> The one-stop-shop is a unique interface and the responsible body. One-stop-shop deals with suppliers. One-stop-shop guarantees the quality of installation and provides ongoing maintenance, repair, and performance monitoring. 	<ul style="list-style-type: none"> Uncertainty over what happens when service contract period ends. No increase in the value of home for homeowners since assets are only leased. Typically, only part of a consumer renewable energy system covered by a servitisation offer. 	
+	INTEGRATED ENERGY SUPPLY MODEL	-
<ul style="list-style-type: none"> Peace of mind of having a zero bills guarantee (if included). Assistance unlocking different parts of the stack (such as flexibility products). Unlike the servitisation model, you own the assets. One-stop-shop has an in-built incentive to ensure systems continue to operate well. 	<ul style="list-style-type: none"> Uncertainty over what happens when guarantee period ends. Fair use limits might compromise comfort or prevent further electrification. Consumers may not be comfortable giving up control of their devices or access to their data, especially in the absence of proper transparency. 	

The first two types (advisory and coordination) do not involve the consumer signing a commercial contract with the one-stop-shop. They are typically provided by independent, non-commercial actors such as government agencies (see Klima Agence case study) or consumer organisations (see CLEAR-X case study). Sometimes advisory or coordination one-stop-shops are provided to consumers by their energy utility, where the latter's incentive is not directly commercial – for example, if they assist consumers in purchasing energy efficient appliances from third party suppliers – but aimed at strengthening their relationship with consumers or fulfilling regulatory obligations.

Types three to five of one-stop-shops are commercial in nature and offer all-inclusive packages to consumers. The opportunity to place a large share of the responsibility in the hands of a single supplier, in charge of a project from step one, is an attractive alternative to navigating a complex and fragmented journey without assistance. Such an all-inclusive proposition has the potential to transform a cumbersome and complex set of decisions and actions by non-experts into a single entry, consumer-friendly offer. This means moving away from a classic 'atomised model',⁴¹ where asset owners directly face

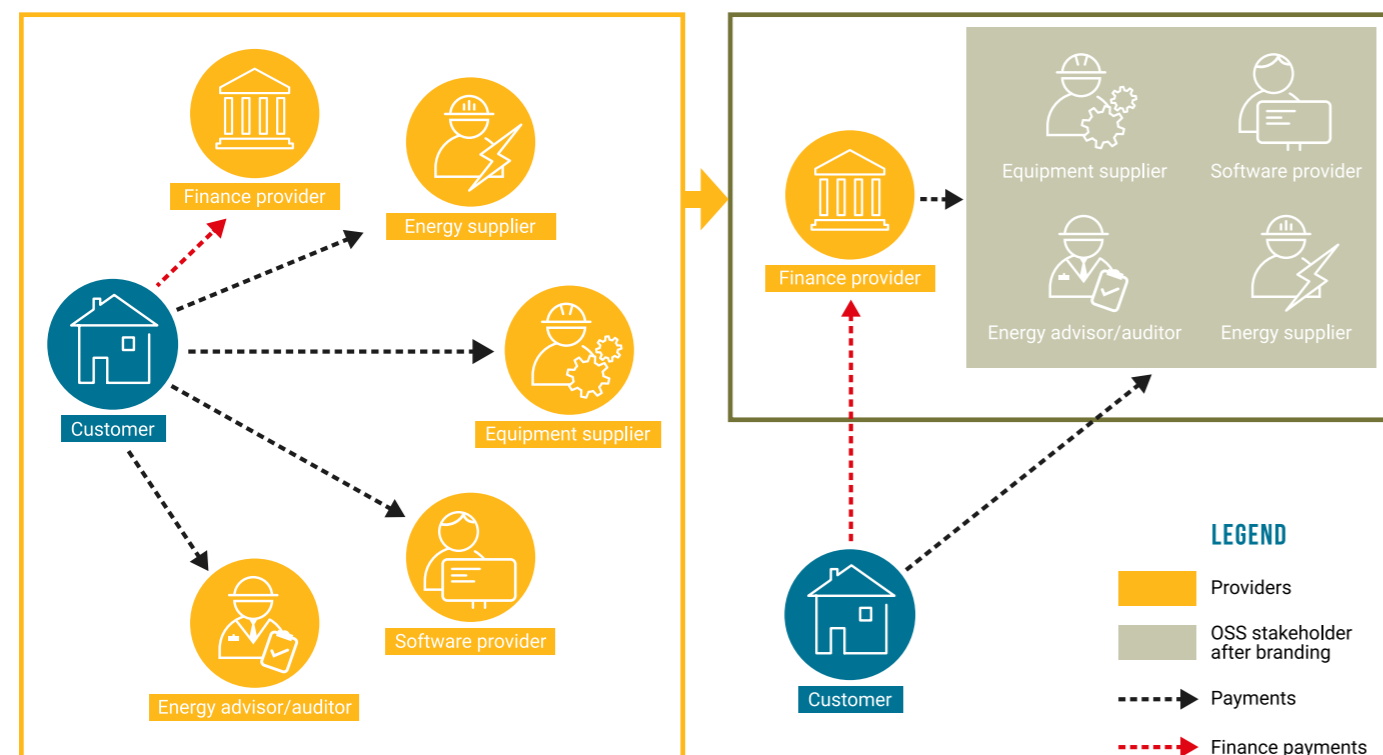
every single entry-point of a complex value chain with several interlocutors, and where the householder – who is a non-expert – must find the best combination of the parts of a complex solution. With a commercial one-stop-shop, a single actor, in co-ordination or collaboration with other actors, takes the responsibility for the whole process and serves as a single point of contact for the householder. **Figure 11** illustrates how a commercial one-stop-shop can simplify the consumer journey by coordinating stakeholders and supplying all information and management directly to the consumer.

A healthy marketplace for consumers will include a range of both independent and commercial one-stop-shop types. Consumers need information and advice that they know is independent from any direct commercial interest. But they also need commercial providers that offer a streamlined and affordable proposition.

GLOBAL CASE STUDIES

The unique advantages, innovations, and compromises of different one-stop-shop models

Figure 11. Moving from the atomised market to a one-stop-shop solution.⁴²



⁴¹ Brown, D. (2018). 'Business models for residential retrofit in the UK: a critical assessment of five key archetypes.' Energy Efficiency 11: 1497-1517.

⁴² Adapted from: Boza-Kiss, B., Bertoldi, P., Della, V.N. and Economidou, M. (2021). *One-stop shops for residential building energy renovation in the EU*. JRC Publications Repository. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC125380>

become clear in specific, real-world contexts. We have produced **11 detailed case studies** to illustrate global best practices as well as different approaches to key barriers and trade-offs.

They are examples of initiatives from business, civil society, and public initiatives that were set up to solve a problem in their specific country contexts. But they reach for similar answers and follow comparable structures. Together, they point towards a blueprint for a fully integrated one-stop-shop solution for the future energy consumer.

These case studies have been selected from the larger pool of 113 examples because they:

- Illustrate an innovative model of **collaboration and coordination** in the marketplace.
- Deliver for the consumer in three interlinked ways: **streamlining** the consumer journey; improving **trust** and consumer protection; making consumer renewable systems more **affordable** or financially beneficial for households.

The complete case studies, including a depiction of their models, can be found in Appendix 2.

Figure 12. Summary of case studies and their potential areas of value.

ORGANISATION AND COUNTRY/REGION	PUBLIC/PRIVATE/NGO	ONE-STOP-SHOP TYPE	DESCRIPTION AND POTENTIAL AREAS OF VALUE
Klima Agence, Luxembourg	Public	Advisory	Public energy agency that provides consumers with impartial and customised advice and directs them to public grants for home energy upgrades.
CLEAR-X, Europe	NGO	Coordination	Collective purchasing campaigns that aggregate demand and ensure product quality, improving trust and affordability in a single scheme.
Uplight Marketplace, United States	Private	Coordination	Utility-branded marketplace that integrates energy services and products into a tailored package using consumer behavioural data.
Enact, United States and 20+ countries	Private	Pay-install-own	A digital platform for both consumers and installers, coupled with software that monitors system performance and savings for greater certainty.
Rocasol, Colombia	Private	Pay-install-own	The coordination of finance and installation provides consumers with a streamlined and customised offer, reducing electricity bills by up to 90%.
Zuwa Energy, Malawi	Private	Pay-install-own	Flexible mobile money payments and strong customer service accommodate for different consumer needs in off-grid settings.
Home Energy One-Stop-Shops, Republic of Ireland	Private (coordinated and accredited by public energy authority)	Pay-install-own	A group of installer one-stop-shops accredited by a public authority that provides tailor-made subsidies, enhancing consumer trust and choice.
Barrio Eléctrico, Puerto Rico	NGO and Private	As-a-service	Not-for-profit that controls an investment vehicle offering solar and storage as-a-service, accommodating different consumer budgets with zero upfront costs.
Wetility, South Africa	Private	As-a-service	As-a-service solar systems coupled with electricity storage and surge protection provide a comprehensive solution to unreliable grid power.
Octopus Zero Bills Homes, United Kingdom	Private	Integrated energy supply	No-bill tariff that drives consumers to own or rent energy efficient and electrified homes with solar and storage and motivates developers to build them.
Reposit Power, Australia	Private	Integrated energy supply	Automated solar and storage systems that provide grid services, guaranteeing seven years of zero bills for consumers.



SECTION 3: DISCUSSION AND RECOMMENDATIONS

ADVANTAGES, TRADE-OFFS, AND GROWTH STRATEGIES

The advantage of a one-stop-shop in comparison to the traditional atomised market situation depends on the model adopted and the quality of implementation. However, the best practice examples described above share **three unique advantages**.

- 1. Coordination.** The supply of a consumer renewable energy system typically involves a confusing web of different stakeholders, each responsible for a discrete product or service. Inversely, there is rarely a uniform and predictable consumer demand for any specific product or service, given the degree of optionality involved (several different combinations of technologies and services) and low consumer awareness. One-stop-shops can act as the bridge between a fragmented supply and a fragmented demand, helping to guarantee, organise, and 'match' demand and supply. They stand in the centre of a disarticulated stakeholder map, generating a consistent project pipeline and encouraging strong partnerships and cooperation between different supply-side actors, from installers to banks to government agencies. They are also well positioned to handle complaints processes and warranty claims, given the number of overlapping stakeholders involved.
- 2. Accreditation.** A lack of consumer protection can undermine trust, especially in rapidly growing or under-regulated markets such as rooftop solar PV or demand-side response. As an intermediary, a one-stop-shop can remedy this situation by

carrying out rigorous product testing, filtering for suppliers and installers that hold certain accreditations (or creating a bespoke accreditation scheme) and setting stringent contractual requirements on suppliers. One-stop-shops can also implement post-works accreditation of the change (for example certifying an uplift in building energy performance – see Republic of Ireland case study). This in turn can help to unlock financing, since there will be a lower perceived risk from banks if they are more certain that the promised efficiency savings will be realised over time.

- 3. Aggregation.** One-stop-shops are well placed to leverage the aggregated demand represented by their customers. This can reduce the up-front costs by unlocking economies of scale, for example through collective purchasing of technologies or bidding schemes where a number of projects are grouped together and offered for competitive tender like any other large infrastructure project. This approach is easiest where a 'critical mass' of demand for a single product (such as certain size solar PV panel) is crossed. However, it can also be used to drive down costs of renovation works, especially if design and materials innovation has introduced greater degree of modularity such as off-site manufactured insulated facades.⁴³ Pooling consumers can also de-risk them from the perspective of financiers and assist in the development of standardised financial products if the consumers have similar conditions and requirements. As a result, consumers will receive financing faster, with less administration and verification requirements, and much more favourable terms. Some pay-as-you-go solar companies are experimenting with off-balance-sheet financing, where they pool and sell their customers' receivables to allow debt funds to deploy larger amounts of capital to small-scale

⁴³ See, for example, the success of Energiesprong, set up in the Netherlands in 2016 and now active in five countries. Typically, an Energiesprong retrofit involves the delivery of off-site manufactured, insulated facades, integrated with renewable heat systems and PV panels as well as lighting and controls.

consumer renewable assets in developing countries.⁴⁴

- 4.** The nature of the one-stop-shop model also gives rise to unique challenges which the above case studies meet in different and innovative ways.
- 1. Narrowing market choice.** By predefining the selection of products and suppliers on behalf of consumers, commercial one-stop-shops restrict the consumer to a small portion of the whole market. This diminishes the consumer choice mechanism, which could have negative consequences on competition and price. Moreover, models which 'modularise' projects so they can be pooled together (like Energiesprong) risk sacrificing customisation, since the consumer has no choice over the materials and technologies used. These risks can be mitigated in a few ways. Many one-stop-shops can simulate consumer choice in their selection of technology suppliers or installers, which competitively 'bid' for projects (see CLEAR-X case study). Others introduce limited market choice directly within a guided one-stop-shop consumer journey. For example, after receiving the Home Energy Assessment by a one-stop-shop in the Republic of Ireland, the consumer can transfer to a different one-stop-shop to carry out the works if they wish to, helping to ensure competitive pricing. EnergySage in the US created a vendor-neutral online comparison-shopping marketplace with live Solar Advisor support. This helps consumers to compare quotes from suppliers with ease, typically saving 10-20% on solar and storage installation.⁴⁵ It also allows EnergySage to monitor and track trends in the solar and storage marketplace by analysing millions of transaction-level data points generated by quotes sent to householders. Ultimately, in a competitive marketplace there should be several integrated one-stop-shop offers which consumers can choose between, and which in turn compete with the traditional range of suppliers.
- 2. Adding costs of a market intermediary.** The cost of running a one-stop-shop service can be high, especially where support is provided post-purchase for the monitoring and optimisation of systems. Where generous government grants are not

⁴⁴ UNDP. (n.d.). *A platform for scaling up off-balance sheet receivables financing for off-grid solar*. Available at: <https://www.undp.org/climate-aggregation-platform/platform-scaling-balance-sheet-receivables-financing-grid-solar>

⁴⁵ Energy Sage (2023). *Frequently Asked Questions*. Available at: <https://communitysolar.energysage.com/faq>

available (see Barrio Eléctrico case study), this additional cost will likely be passed on to the consumer. It is crucial that this is done in a way that maintains a streamlined consumer journey. For example, charging consumers for individual one-stop-shop services like carrying out an energy audit would add unnecessary friction and could deter interested but not highly motivated consumers. One of the main benefits of the one-stop-shop model is that the cost of upstream planning tools are frequently bundled with the core investments, encouraging consumer engagement. The best practice case studies illustrate some strategies for off-setting costs without disturbing the consumer journey: Enact charges both installers and consumers that use the platform an ongoing subscription fee; Rocasol takes a percentage cut from the overall price of the package; Wetility bundles installation with ongoing services meaning the former is never paid for explicitly. It is likely that due to economies of scale, its leverage effect on other marketplace actors, and its access to attractive loans thanks to bigger investment volumes and project pooling, a one-stop-shop will be able to offer significantly lower prices to consumers than traditional suppliers. This cost differential will likely wipe out the costs of acting as an intermediary. Moreover, energy supply integrated models which unlock revenue streams from electricity market trading (see Reposit Power and Octopus Zero Bills Homes case studies) can offer very attractive installation offers to consumers, since this is not their core revenue-generating business.

One-stop-shops can be offered directly by companies, by public bodies, or by trusted civil society bodies like consumer organisations. Our analysis suggests that the one-stop-shops that succeed at scale adopt one of three main growth strategies:

- 1. Leveraging an existing consumer base**, such as a utility offering expanded services (see Utility Marketplace and Octopus Zero Bills Homes case studies).
- 2. Attracting consumers** that are interested in renewable technologies by offering a superior product or service that better meets consumer needs than traditional competitors, for example by providing easy-to-use software, installing 'as a service', or guaranteeing zero bills (see Reposit Power, Enact, CLEAR-X, Rocasol, and Wetility case studies).

3. Engaging new consumers from the majority cohort that are not aware of the benefits of integrated consumer renewable systems or the help that is available along the consumer journey. Trusted providers are best positioned here, such as civil society organisations or strategic public-private partnerships (see Republic of Ireland case study). Providers must be willing to invest significantly in marketing, communication, and outreach activities to generate demand, such as Zuwa Energy in Malawi. This growth strategy is most likely to be successful in settings where traditional energy consumers are very badly served, such as in Puerto Rico where Hurricane Irma and Hurricane Maria left hundreds of communities without energy service for more than 10 months (see Barrio Eléctrico case study).

RECOMMENDATIONS

Many markets are approaching – or have already crossed – a tipping point, with renewable consumer technologies reaching cost parity with their fossil fuel competitors and delivering increasing returns.⁴⁶ Yet a fragmented and burdensome consumer journey is preventing many from acting, even where the economics make sense.

One-stop-shops can transform the marketplace, supporting consumers through their journey and acting as a bridge between a fragmented supply and a fragmented demand. At scale, they have the potential to activate tipping points and accelerate the transition to zero emissions.

To unlock this change, we are calling on policymakers to:

1. Conduct a review to understand consumer needs, stack readiness, and the existing state of market offerings along the consumer journey. This could be in partnership with national consumer organisations, or with international organisations such as the World Bank. The review should be used as a guide to identify priority policy changes and best practice solutions that meet consumer needs.

⁴⁶ Systemiq (2023). *The Breakthrough Effect*. Available at: <https://www.systemiq.earth/breakthrough-effect/#:~:text=The%20Breakthrough%20Effect%20report%20is>

It should be part of an overall strategy and pathway to protect and empower consumers through the transition to a clean energy system.

- 2. Establish or directly fund public or NGO-run one-stop-shops** that deliver the most value to consumers and that private actors are unlikely or unable to provide. Independent advice and coordination one-stop-shops, run by public bodies or NGOs like consumer organisations, are a crucial part of a trustworthy and competitive marketplace. They educate and inform consumers and orient them towards solutions that best meet their needs. They can also target low-income and vulnerable consumers that are not directly served by market offerings.
- 3. Indirectly support commercial one-stop-shop services.** For example, governments can promote the best one-stop-shops in public awareness campaigns, or connect consumers to them as part of public advisory services. Governments should also develop open-source software tools that can be used by one-stop-shops to improve their offerings, such as a location-based cost savings calculator or detailed rooftop solar potential map.
- 4. Design technology subsidy and electricity pricing regimes** in a way that incentivises one-stop-shops and their consumers to offer and adopt integrated renewable systems (for example offering higher technology subsidies to households that also invest in building efficiency improvements, and opening electricity markets to aggregators of residential end-users).

Existing one-stop-shop services should review the best practices in this report and consider how they can strengthen their services by making the consumer journey **more streamlined, trustworthy, and affordable**. Consumer rights and needs should be upheld around key issues such as interoperability, data security and privacy, and redress.

We are also calling on one-stop-shops to explore new opportunities to improve the consumer experience:

- 1. Create a new accreditation** for consumer renewable energy systems to attract finance. It can be difficult for consumers to persuade banks to lend to individual projects, given the level of evaluation and verification required on a project's credentials. By performing this role on behalf of groups of projects that meet a certain set of

standards, one-stop-shops could streamline the process for all involved and make affordable financing accessible for more consumers.

- 2. Add income from the sale of carbon credits** to the consumer revenue stack. If the one-stop-shop can calculate, monitor, and verify the carbon emissions savings from a project, these could be certified as carbon or socio-carbon credits and sold. This would unlock additional investment into consumer renewable systems and expand the revenue stack for consumers.
- 3. Introduce online consumer reviews.** Especially if building construction is involved, problems with projects can arise a long time after the initial installation. Moreover, consumers can receive poor service from suppliers which nevertheless falls short of the seeking legal redress. Online reviews written by consumers for other consumers can mitigate these problems, levelling the information asymmetry between consumers and suppliers.

- 4. Create a software tool** to help consumers estimate and size their systems. Many one-stop-shops offer calculators that help consumers to estimate the savings they could receive from their system. But these calculators are often not sophisticated enough to estimate savings from more integrated systems, for example which combine on-site changes with an electric vehicle.⁴⁷ One-stop-shops should explore how AI can assist in the development of new tools that provide better assistance to consumers.



⁴⁷ Integrate to Zero. (2023). *Sizing consumer renewable energy systems and their benefits: a review of existing tools*. Available at: <https://integratezero.org/insights/sizing-consumer-renewable-energy-systems-and-their-benefits-a-review-of-existing-tools>

CONCLUSION: A WAY FORWARD

To advance the innovation, insight, and cross-cutting collaborations we need, Consumers International will continue to build the consumer journey in the energy transition including exploring effective business models and policy recommendations. In 2024, we will support independent advisory one-stop-shops to

improve and expand the information and advice they provide. We will also provide opportunities for commercial one-stop-shops to exchange learnings and best practices globally. Join us to transform energy systems with and for consumers.



GLOSSARY

Distributed energy resources: small-scale energy resources usually situated near sites of electricity use, such as rooftop solar panels and battery storage.

Demand flexibility: encouraging customers to shift electricity demand to times when electricity is more plentiful, typically through prices. This helps balance energy supply and demand for a more efficient grid. New digital systems can maximise the opportunities of demand response by automating and optimising energy generation, storage, and consumption by connected devices within a household.

Efficiency: ratio between energy input and useful output. Improvements in energy efficiency at home can involve renovation works, such as changing windows or the materials making up the building envelope. This means that less energy needs to be used to reach a comfortable temperature.

Feed-in-Tariff: electricity prices that are paid to renewable energy producers for each unit of energy produced and injected into the electricity grid. This can be an incentive for households to install renewable energy infrastructures.

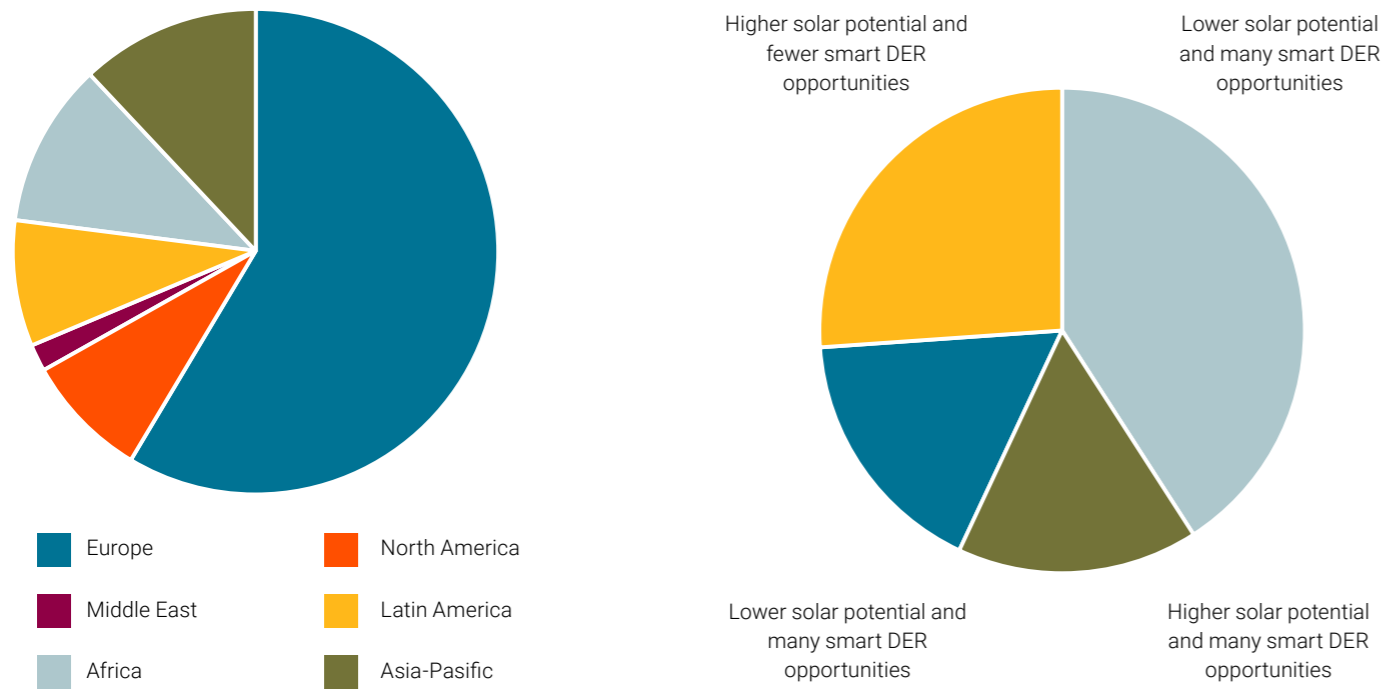
Grid: A power grid is a network of power lines and associated equipment used to transmit and distribute electricity over a geographic area

Integration: Integration means that the different clean energy technologies that contribute to power generation, storage and use are well connected between themselves and to the grid. This can help balance the supply and use of energy, which can be monitored and managed by grid operators or technologies such as smart meters. It can also help consumers at home maximise their energy savings and their gains from selling energy.

Renewable consumer energy systems: involve the local integration on-site and on-grid of clean energy generation, such as solar and wind, with energy storage through batteries and the flexible powering and heating of buildings and charging of electric vehicles.

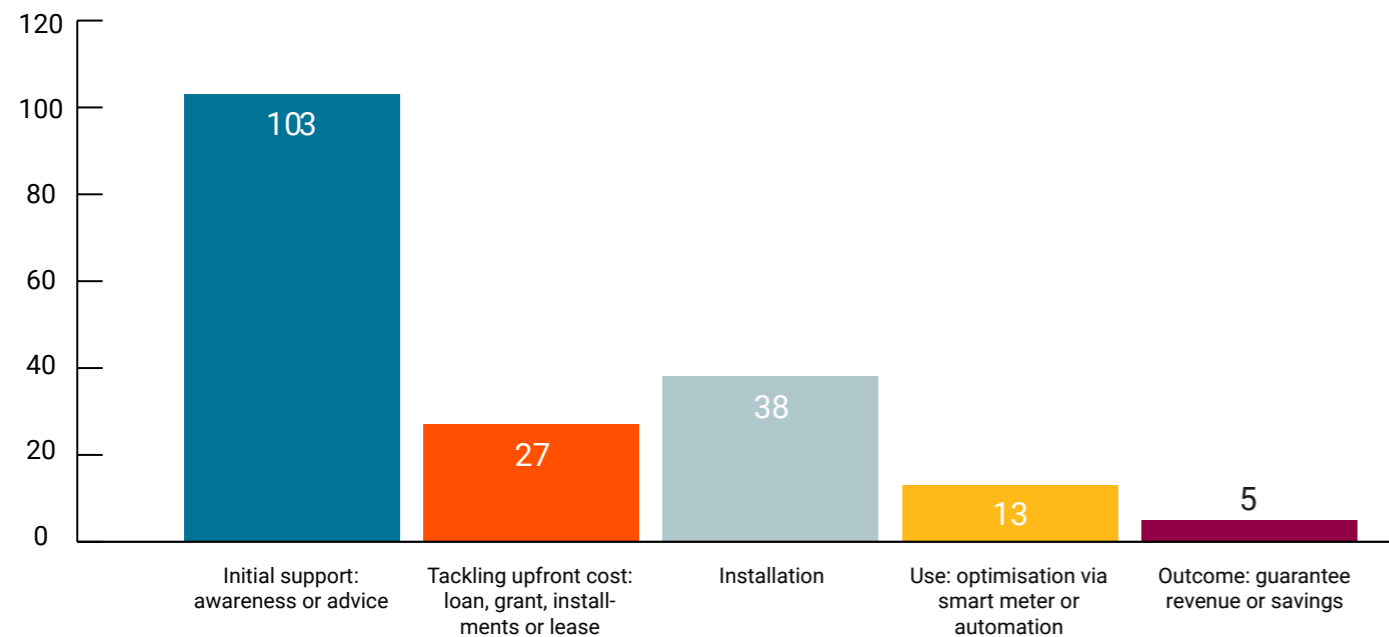
One-stop-shops: holistic platforms that provide information, customised advice, and in some cases direct (technology provision and installation, software, and financing) services to consumers. One Stop Shops can be offered directly by companies, by public entities, or by trusted civil society bodies like consumer organisations.

APPENDIX 1: GLOBAL MAPPING SUMMARY



Organisations acting as one-stop-shops by regions

Stack readiness in countries with one-stop-shops



Number of one-stop-shops offering support at each stage of the consumer journey

APPENDIX 2: CASE STUDY MODELS AND INFORMATION

KLIMA AGENCE, LUXEMBOURG: ADVISORY

Public energy agency that provides consumers with impartial and customised advice and directs them to public grants for home energy upgrades

1. Overview

Energy agencies are close to both policymakers and consumers, making them a strong one-stop-shop for ambitious renovations. They also provide tailored advice to consumers on a wide range of topics, including solar panels, efficiency, clean heating, electric vehicles, and energy affordability.

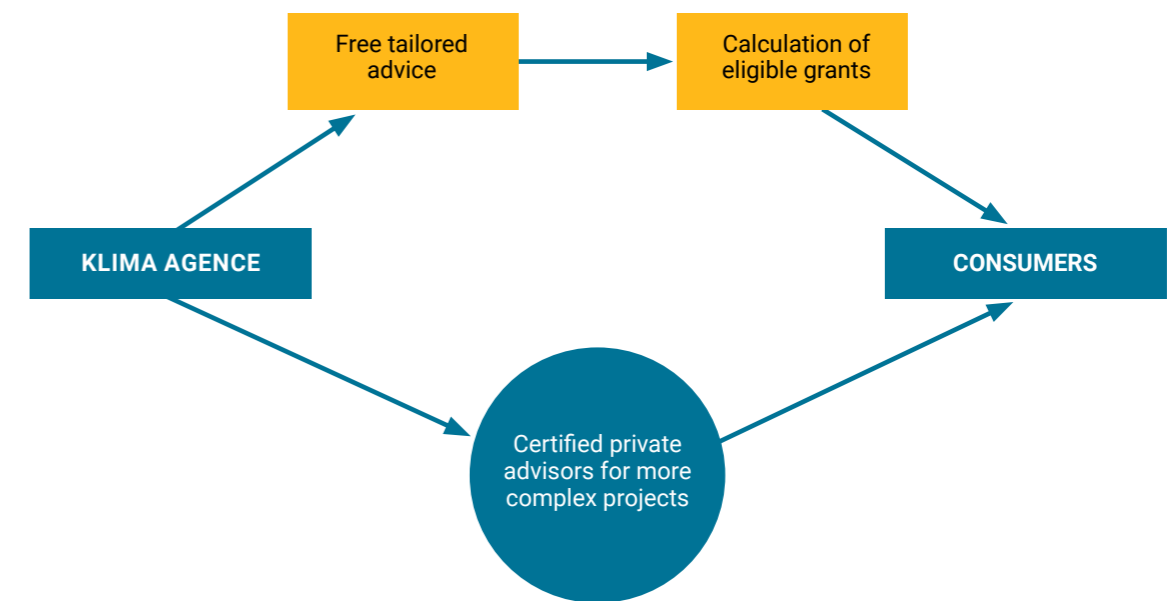
Factors impacting affordability

- Personalised advice is free; access to grants lowers financial burden of installation.

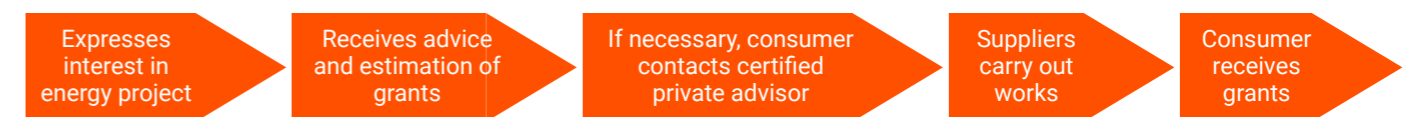
5. Impact

Since 2009, the Klima Agence has received over 60,000 calls on their hotline and over 3 million visits on their website, most of which in the last years. In 2022 alone, they had 12,000 interactions with households in 2022, with 50% of consumer requests about solar PV and 30% about heating.

2. KLIMA AGENCE'S model



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- Online calculators estimate the public funds consumers are entitled to and links to grant applications.

Contribution to consumer trust

- Standardised exams and diplomas for private advisors before they become 'Klima-Agence certified'.

6. Key enablers

- Agency partners with tradespeople, who are the first point of contact for 60% of consumers for renovation projects (Klima Agence survey, 2017).
- Status as trusted and independent and impartial provider of scientific advice since 2009.

CLEAR-X, EUROPE: COORDINATION

Collective purchasing campaigns that aggregate demand and ensure product quality, improving trust and affordability in a single scheme.

1. Overview

CLEAR-X is an EU-funded Horizon 2020 project hosted by BEUC. They test renewable energy products before they are offered to consumers and negotiate prices on their behalf.

Consumer organisations in 7 countries run collective purchasing campaigns for renewable energy technologies: Bulgaria, Cyprus, Lithuania, North Macedonia, Slovakia, Slovenia, and Portugal.

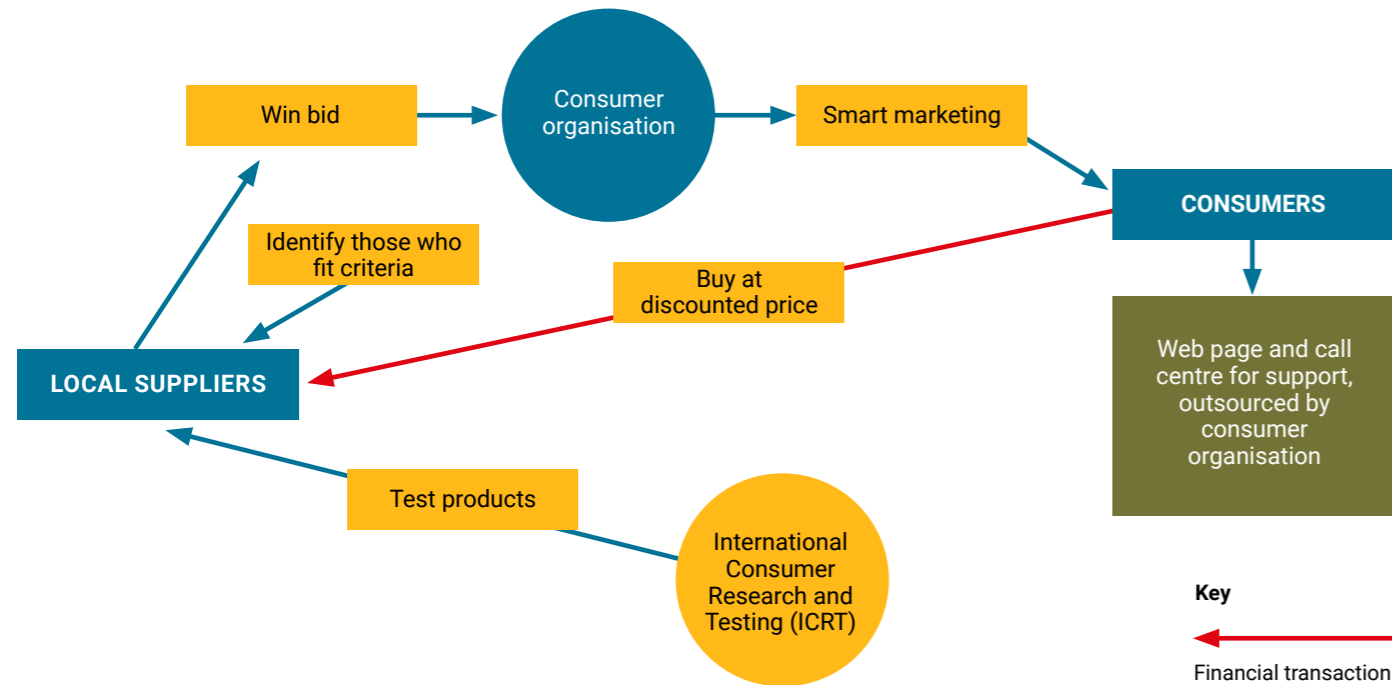
Contribution to consumer trust

- National consumer organisations trusted to find the best deal for households. In Slovenia, a consumer said 'I trust the organiser of the purchase to provide the best quality-price ratio. Overall, the purchase and delivery process were positive experiences'.⁴⁸
- Product testing to ensure technologies are best in class in terms of safety and efficiency.

Factors impacting affordability

- Discounted price from collective purchase e.g. 15% lower in Cyprus solar panel campaign.
- Some suppliers selected offer financing options for consumers such as paying in instalments with very low interest rates.

2. The CLEAR-X model



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- Negotiations with suppliers to secure discounted price done on behalf of consumers.

5. Impact

- CLEAR-X's predecessor series of 17 group purchase projects in Western and Central Europe led to 29,000 renewable energy installations.⁴⁹
- In Slovenia, a heat pump tumble drier campaign received 2000 emails and 1000 calls.⁵⁰

6. Key enablers

- Water-tight contracting with suppliers, which are always liable for issues the consumer faces.
- Use of digital calculation tools to educate consumers about potential energy savings.

⁴⁸ Slovene Consumer's Association (ZP2) (2023). *ZPS Satisfaction survey*

⁴⁹ CLEAR-X website. Available at: <https://www.clear-x.eu>

⁵⁰ Klemenčič, P (2023). Interviewed by Morgane Mayoux. 9 October, online.

UPLIGHT MARKETPLACE, UNITED STATES: COORDINATION

Utility-branded marketplace that integrates energy services and products into a tailored package using consumer behavioural data.

1. Overview

Uplight is a B Corp that supports utilities to promote smart bundles of programs, products and services and use behavioural insights to make them as attractive as possible on online marketplaces.

"What if customers could buy an electric vehicle charger, receive a rebate, schedule installation and sign up for a time-of-use rate with one click?⁵¹"

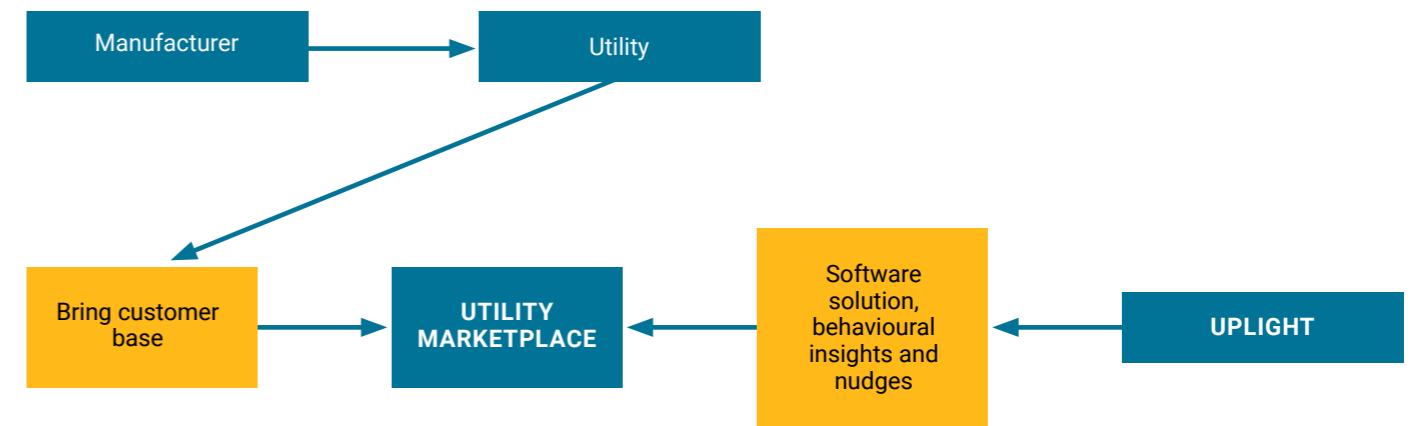
Contribution to consumer trust

- By receiving tailored notifications and advice from utilities' insights on their needs, consumers trust that the suggested solutions are beneficial to their home energy system.
- Customers often perceive their utility as a trustworthy and knowledgeable provider of advice on energy.

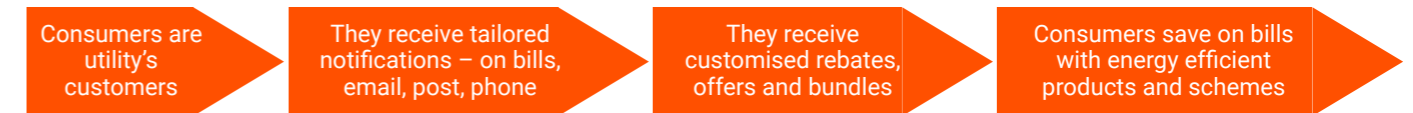
Factors impacting affordability

- Instant rebates make energy savings devices more accessible to households than if they had been bought on individual online marketplaces that are not integrated with their utility.

2. The UPLIGHT MARKETPLACE model



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- Consumers benefit from having access to information and solutions (from time-of-use rates to smart appliances) in the same place.⁵²
- To access instant rebates, customers just need to enter their name, address, phone, and email – quicker than having to remember their utility account username and password.

5. Impact achieved

- Through its marketplaces, Uplight serves over 30 million energy consumers through 80 utility clients.⁵³
- In the first year of their marketplaces, an estimated 150 million kWh energy savings, 500M\$ energy bill savings, and 2M tonnes of prevented carbon emissions were achieved thanks to the purchase of efficient devices.⁵⁴

6. Key enablers

- Leveraging behavioural insights to design effective nudges that translate into a 13% increase in customer engagement.⁵⁵
- Utility branding of marketplace makes the consumer journeys consistent and predictable.

⁵¹ Uplight (2019) *White Paper: The Power of Utility-Branded marketplaces*. Available at: https://uplight.com/wp-content/uploads/2019/10/U_WhitePaper_PowerOfUtilityBrandedMarketplaces.pdf

⁵² ibid

⁵³ Uplight (2021). *The New "Black Friday of Spring" for Utility Marketplaces*. Available at: <https://uplight.com/resources/earth-day-the-black-friday-of-spring-for-utility-marketplaces/>

⁵⁴ ibid

⁵⁵ ibid

ENACT, UNITED STATES AND 20+ COUNTRIES: PAY-INSTALL-OWN

A simple digital platform for both consumers and installers, coupled with software that monitors system performance and savings to for greater certainty.

1. Overview

Enact provides a platform for rooftop solar, battery storage, and electric vehicle charging and other building energy upgrades. Enact works with all major original equipment manufacturers (OEM) and installers who benefit from a single platform for project management, in markets where software and monitoring solutions are fragmented. The full platform has launched in three countries including the UAE and Enact is present in over 20 countries.

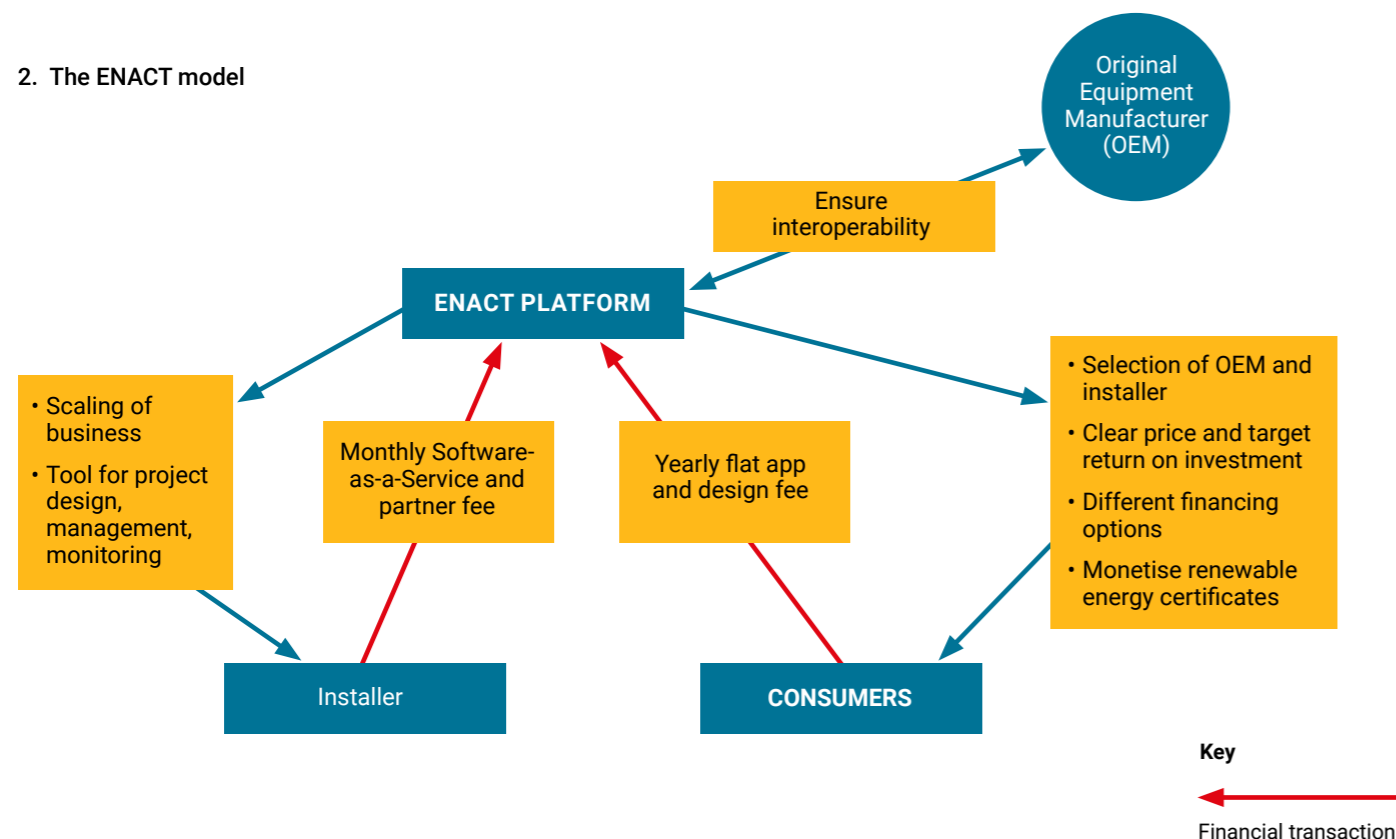
Contribution to consumer trust

- Enact's app provides a 25-year projection of savings, a live monitoring of system performance, and battery health. The app is also integrated with the utility and solar PV hardware.
- Enact independently selects its providers and installers, assessing how fast partner solar companies resolve challenges when they arise.
- Enact takes overall responsibility for malfunctions, preventing consumers from handling individual warranties from different manufacturers.

Factors impacting affordability

- Consumers pay a low flat fee every year for the platform which helps them to maximise system revenues and cost savings.

2. The ENACT model



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- Enact consumer app integrates with all major OEMs to track project savings and financial outcomes live, and monitors system performance and battery health on an ongoing basis.
- Enact imaging-based design software enables consumers to construct 3D designs of their solar installations easily.
- Enact handles municipal approval and permitting and organises installation of one to two days.

5. Impact achieved

- Over \$1.5bn and 3GW worth of solar projects processed through Enact's platform every year.
- Delivered solar systems to over 1000 homes in UAE.

6. Key enablers

- Careful choice of markets, focus on consumer protection beyond regional regulation, and effective automation.
- Partnerships with over 100 solar companies and a wide range of market actors enables a seamless consumer journey.

ROCASOL, COLOMBIA: PAY-INSTALL-OWN

The coordination of finance and installation provides consumers with a streamlined and customised offer, reducing electricity bills by up to 90%.

1. Overview

In Colombia, the number of consumers exporting renewable energy to the grid rose from a few hundred in 2019 to over 5700 in 2023.⁵⁶ Prosumers benefit from 'solar credits' and a net metering system, which significantly reduces electricity bills without the need for investing in electricity storage.

Since its launch in 2022, Rocasol has acted as an intermediary between fragmented market actors to streamline the process

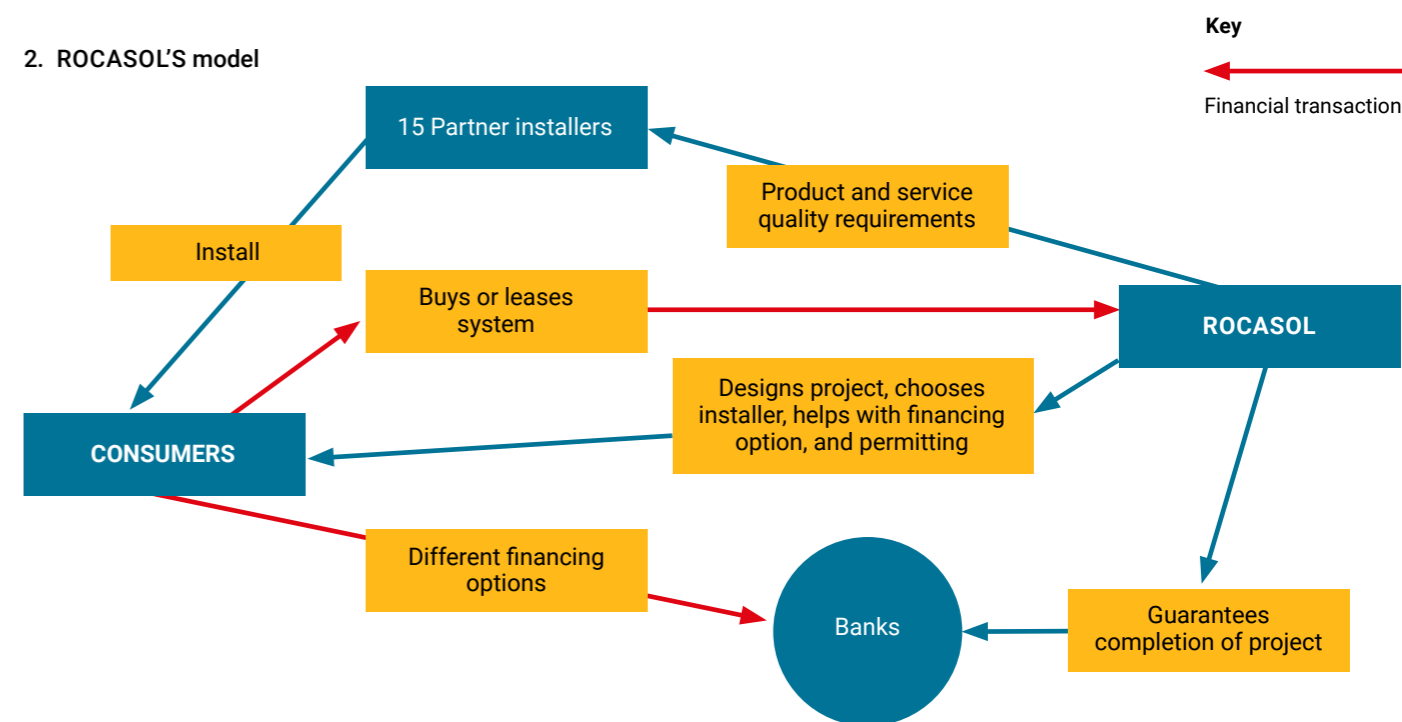
the right installer, financing options, system, equipment, and warranties.

- Rocasol assist consumers with permitting and offer an online platform for monitoring the project with installers.

Contribution to consumer trust

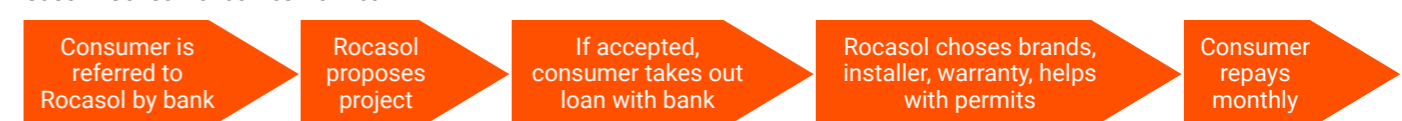
- Before the project starts, the consumer receives an estimation of the savings they can achieve.
- Rocasol only work with tier-1 solar panels and require installers to offer trustworthy warranties to consumers.

2. ROCASOL'S model



3. Consumer journey

Case 1. Consumer comes from bank



Case 2. Consumer comes from installer



of installing solar panels. It offers different financing options with partner banks to provide a clear value proposition to clients.

4. Benefits

Streamlining of consumer journey

- Rocasol coordinates market actors behind the scenes to offer a guided consumer journey, linking up consumers with

Factors impacting affordability

- Dedicated financing options, provided by partner banks, are tailored to the consumer's needs, ensuring monthly payments are lower than the consumer's previous energy bills.

5. Key enablers

- Generous solar credit scheme and net metering in Colombia providing a major incentive for consumers.
- Large web of partner installers and financial partners ensure steady flow of consumers, so Rocasol can focus on project completion.

⁵⁶Colombia. Comisión de Regulación de Energía y Gas (2023) *Presentación: visión y respuesta de la regulación a los nuevos requerimientos de la demanda.*

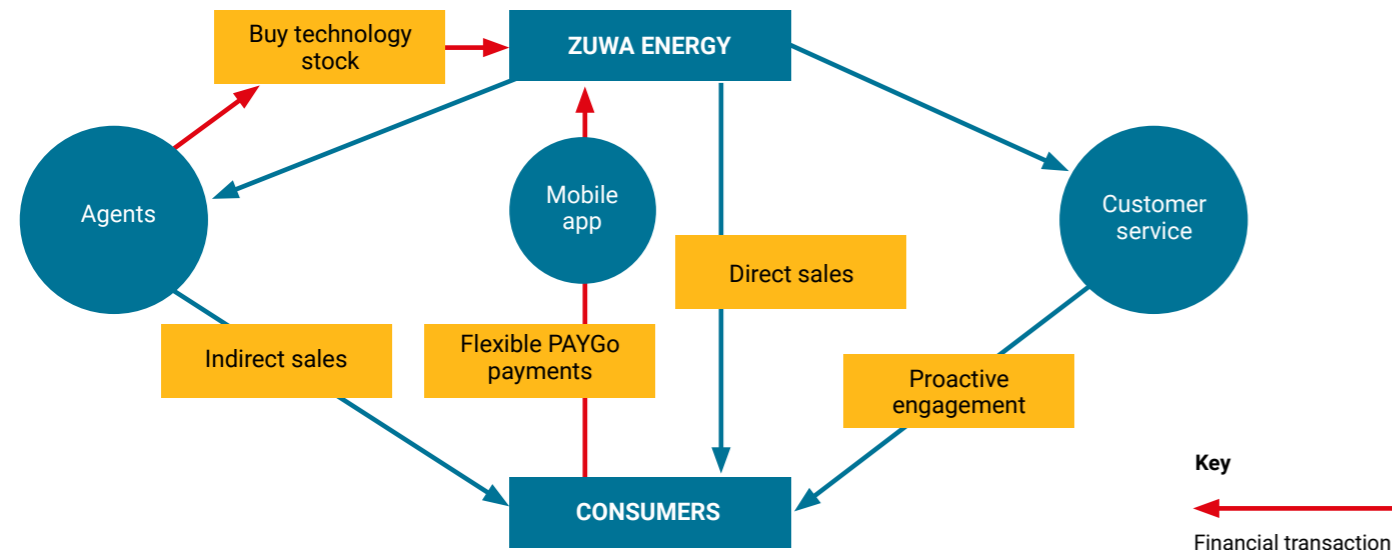
ZUWA ENERGY, MALAWI: PAY-INSTALL-OWN

Flexible mobile money payments and strong customer service accommodate for different consumer needs in off-grid settings.

1. Overview

In 2016, only 4% of Malawi's rural population had access to electricity.⁵⁷ Zuwa Energy is a solar asset consumer financing company in Malawi, whose targets are off-grid consumers without access to electricity. Zuwa's mission is to address energy poverty, isolation, and pollution from traditional fuels by providing access to solar home systems with PayGo mobile payments.

2. ZUWA'S model



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- Over 100 Solar Champions actively engage consumers in their communities.
- Consumers are then allocated a single point of contact from Zuwa's customer service team to take care of them during and after the completion of the sale. Every customer is called at least once a month.

5. Impact achieved

As of 2023, Zuwa Energy has just over 10,000 active customers,⁶⁰ and has brought clean energy access to an estimated 50,000 people.⁶¹

6. Key enablers

- Proactive customer engagement and a sustained focus on filling gaps in consumer-facing performance.
- Credit screenings of prospective consumers reduce the number of missed payments and avoid consumer indebtedness.

⁵⁷ World Bank data, via Sustainable Energy for All. Available at: <https://www.se4all-africa.org/seforall-in-africa/country-data/malawi/#:~:text=In%20terms%20of%20energy%20supply,for%202.3%25%20of%20all%20energy>.

⁵⁸ Gogla (2023). Case Study- Zuwa Energy. Available at: <https://www.gogla.org/reports/doubling-collection-rates-case-study-zuwa-energy/>

⁵⁹ Reserve Bank of Malawi (2023). National Payment System (NPS) Report-First Quarter 2023. Available at: <https://www.rbm.mw/PaymentSystems/>

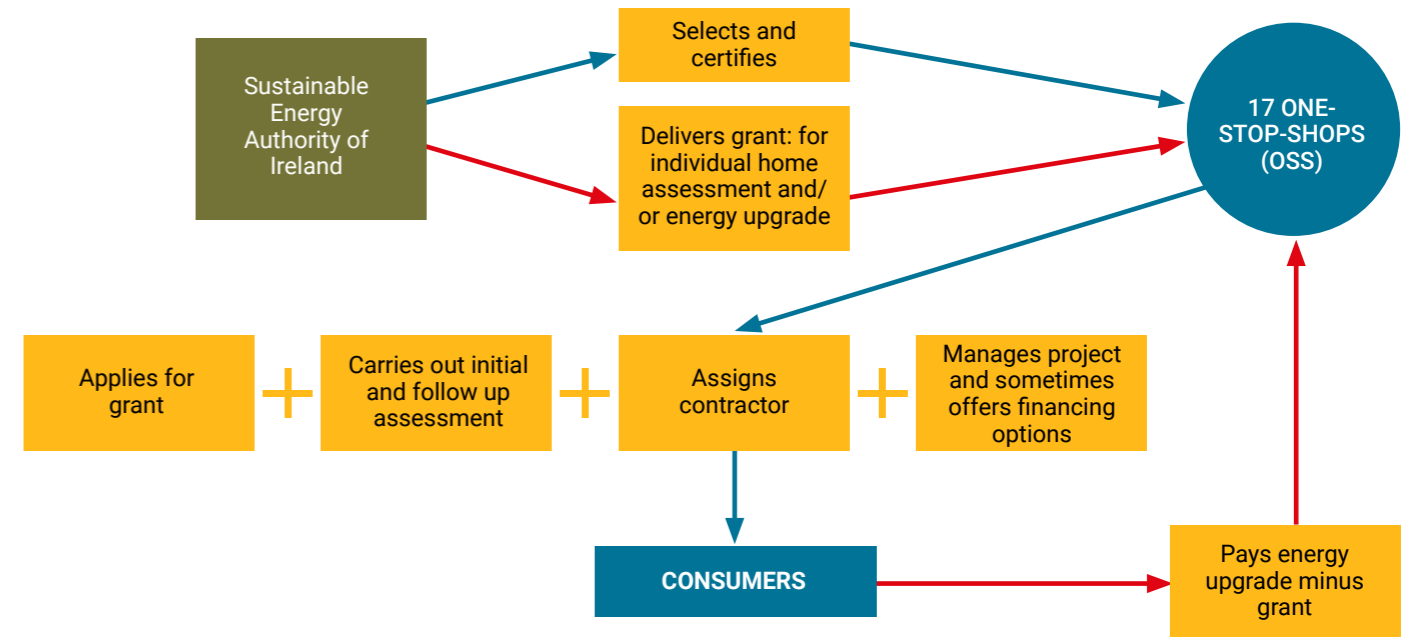
REPUBLIC OF IRELAND HOME ENERGY ONE-STOP-SHOPS: PAY-INSTALL-OWN

A group of installer one-stop-shops accredited by a public authority that provides tailor-made subsidies, providing consumers with both trust and choice.

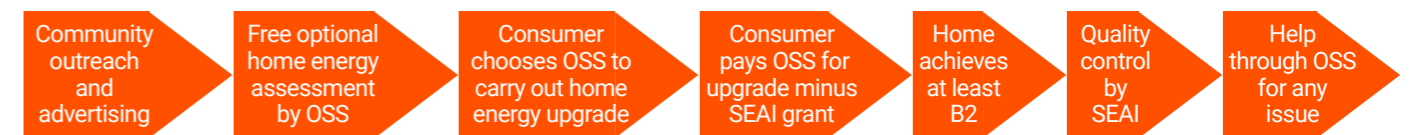
1. Overview

The Sustainable Energy Authority of Ireland (SEAI) coordinates and subsidises a group of one-stop-shops that provide advice and installation for individual consumers, communities, and businesses. SEAI launched the One-Stop-Scheme in February 2022 which sets the rules and administers the process of home energy upgrades. They pre-select 17 trusted and certified one-stop-shop providers, which apply for the government grants on behalf of the consumer and take responsibility for project outcome.

2. SEAI's model



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- The one-stop-shop directly applies for the grant.
- Many steps in consumer journey are automated, such as data transfers on performance.

Contribution to consumer trust

- Before becoming a SEAI certified one-stop-shop, the suppliers must meet pre-defined criteria which include customer care.
- Projects are assessed after the works, to ensure one-stop-shops have provided a B2 Home Energy Rating.⁶²

⁶² Sustainable Energy Authority Of Ireland SEAI. (n.d.). B2 Home Energy Rating. Available at: <https://www.seai.ie/home-energy/home-upgrades/b2-rated-home/#:~:text=That%27s%20because%20a%20B2%20rated>

Factors impacting affordability

- The energy agency covers 350 euros for the initial home energy assessment and the households pays the difference to the one-stop-shop.
- The average grant for private homes is usually 23,400 euros, which is over a third of the average cost of the energy upgrade.

5. Impact achieved

Since its launch in February 2022, there have been over 3,700 home energy assessments. 1,700 upgrades have taken place and over 800 additional project applications have been received and are yet to be completed.

6. Key enablers

1. Good relationships between the different stakeholders allowed scheme to scale efficiently.
2. SEAI are a trusted public agency to front communication campaigns, with successful targeted community outreach, advertising, and awareness raising to maximise impact.

BARRIO ELÉCTRICO, PUERTO RICO: AS-A-SERVICE

Not-for-profit that controls an investment vehicle offering solar and storage as-a-service, accommodating different consumer budgets with zero upfront costs.

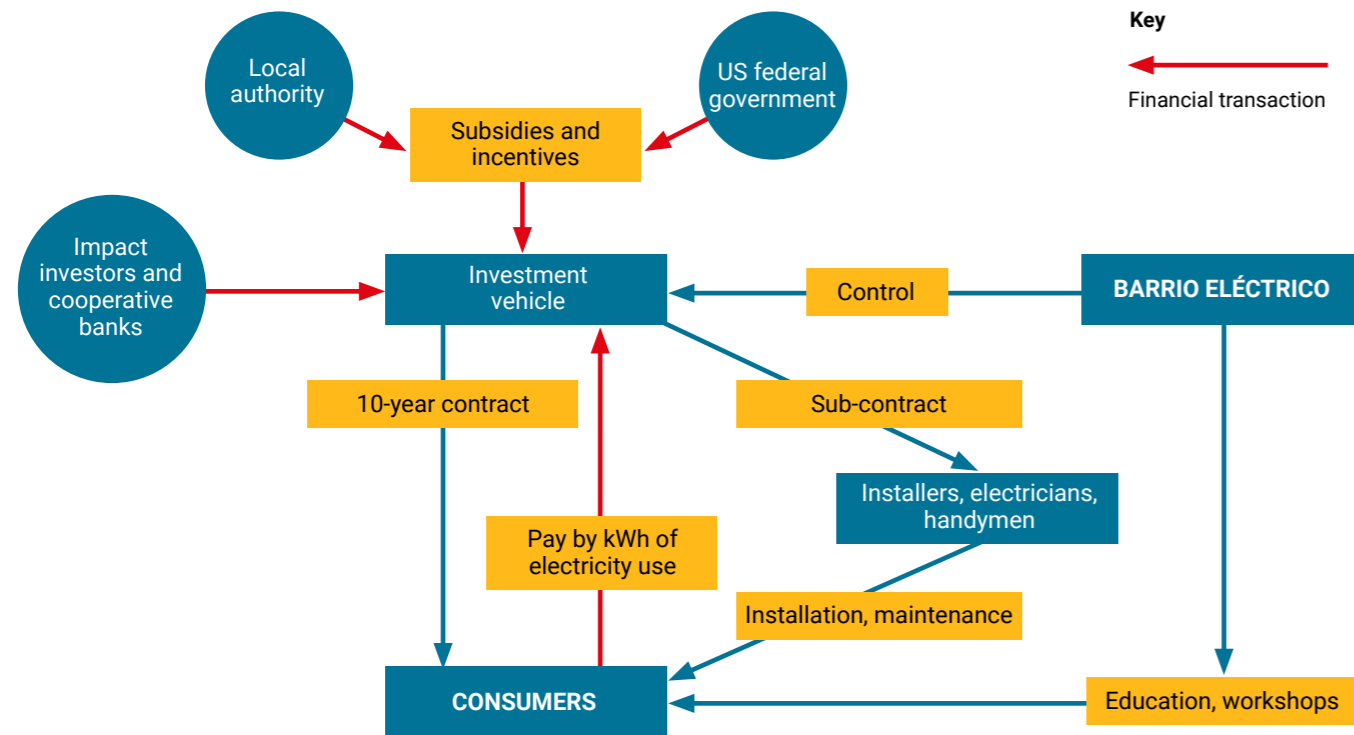
1. Overview

Consumers of Barrio Eléctrico only pay for the energy they use and benefit from maintenance and repair throughout a 10-year service contract. After two hurricanes devastated Puerto Rico in 2017, Barrio Eléctrico was created as a solution to an unreliable, carbon-intensive grid. Its goal as a non-profit organisation is to provide affordable solar power for low- and moderate-income households.

Factors impacting affordability

- Barrio Eléctrico receives public funding and finance from impact investors and cooperatives, so they can offer a beneficial value proposition to consumers.
- During the initial contact with customers, Barrio Eléctrico assesses the household's energy and storage needs, and can accommodate their offer to the consumer's budget.
- Households pay nothing upfront and only owe Barrio Eléctrico a unit price per kWh of used energy at a maximum price of 21c. This is below grid prices, and eligible households can get additional municipal aid.

2. BARRIO ELÉCTRICO'S model



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- Barrio Eléctrico sub-contract to installers and help households during all steps, including a free home inspection and in-person contract signing to ensure consumer understanding.

Contribution to consumer trust

- Barrio Eléctrico has a community-centric approach: they organise community events, meetings and roundtables to raise consumer literacy and build trust.
- The 10-year contract offered to consumers includes maintenance, repairs, and adjustment of system size if needed. After this time, households will have the option to purchase the equipment or renew the service contract.

5. Impact achieved

Barrio Eléctrico have installed 100 systems. They have a goal of 12,000 new systems in the next four years.

6. Key enablers

- Community outreach and education approach catalyses consumer engagement.
- Local partnerships with mayors, installers, electricians, and NGOs enable a holistic approach to households' needs.
- Full servitisation model means directly consumer needs; third-party owned model is also key to securing federal grants.
- Thanks to their grid-ready solar systems, Barrio Eléctrico could operate a virtual power plant in the future.

WETILITY, SOUTH AFRICA: AS-A-SERVICE

As-a-service solar systems coupled with electricity storage and surge protection provide a comprehensive solution to unreliable grid power.

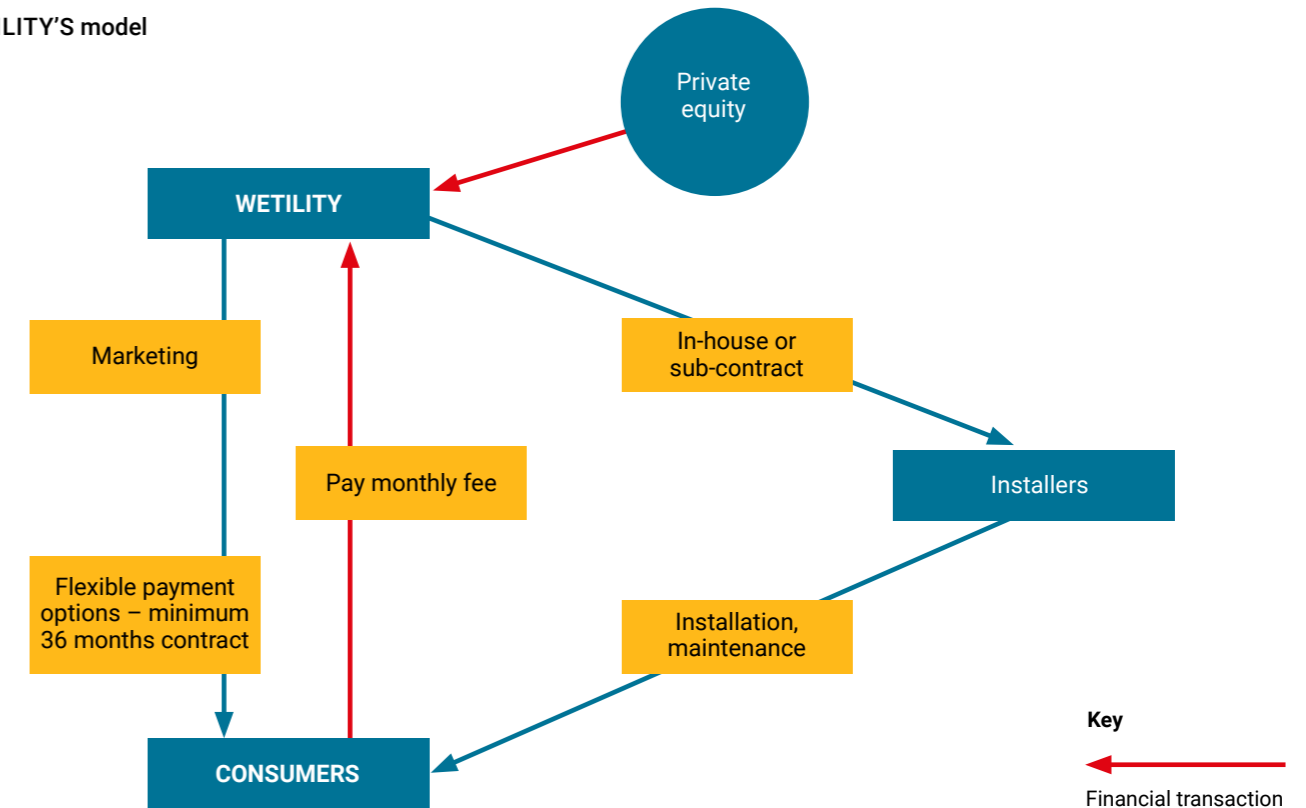
1. Overview

South African households have faced load shedding, surges, and unequal energy access in recent years. For four years, Wetility offers solar and battery systems for which consumers pay monthly. Since September 2023, Wetility's new Beast Bundle takes responsibility for financing, solar, storage, meter, a designated app, and smart geyser that automatically heats at the most beneficial times during the day. The smart system also stores energy in preparation for power cuts.

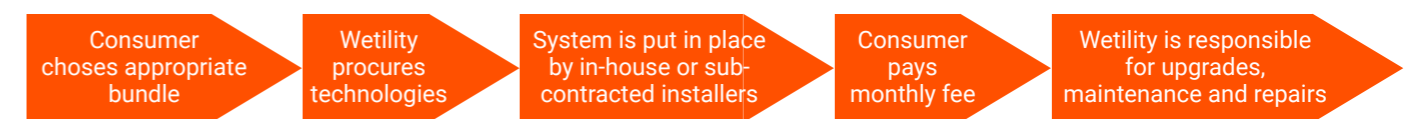
Factors impacting affordability

- Wetility requires a deposit, but 80% of its customers don't pay upfront. Customers can save up to 50% of their energy bill, and their aim is to have 90% of systems that provide savings to consumers.
- Wetility negotiates lower prices with its suppliers, thanks to demand aggregation from its customers.

2. WETILITY'S model



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- Wetility offers a convenient one-stop-shop for upgrades, questions, repairs, and maintenance.
- The company uses smart automation to optimize the moment of the day when water is heated, monitor battery health via app, and provide surge protection.

Contribution to consumer trust

- The company accredits loose franchise installers by conducting exams to ensure they meet the required standards.

5. Key enablers

- Wetility's 20-year product offers customers upgrades, repairs, and maintenance for a fixed monthly fee throughout the leasing period.
- Their easy-to-use app monitors battery health, and the amount of energy coming from the grid and home solar panel.
- As a demand aggregator, Wetility can provide lower prices to consumers.

OCTOPUS ZERO BILLS HOMES, UNITED KINGDOM: INTEGRATED ENERGY SUPPLY

No-bill tariff that drives consumers to own or rent energy efficient and electrified homes with solar and storage and motivates developers to build them.

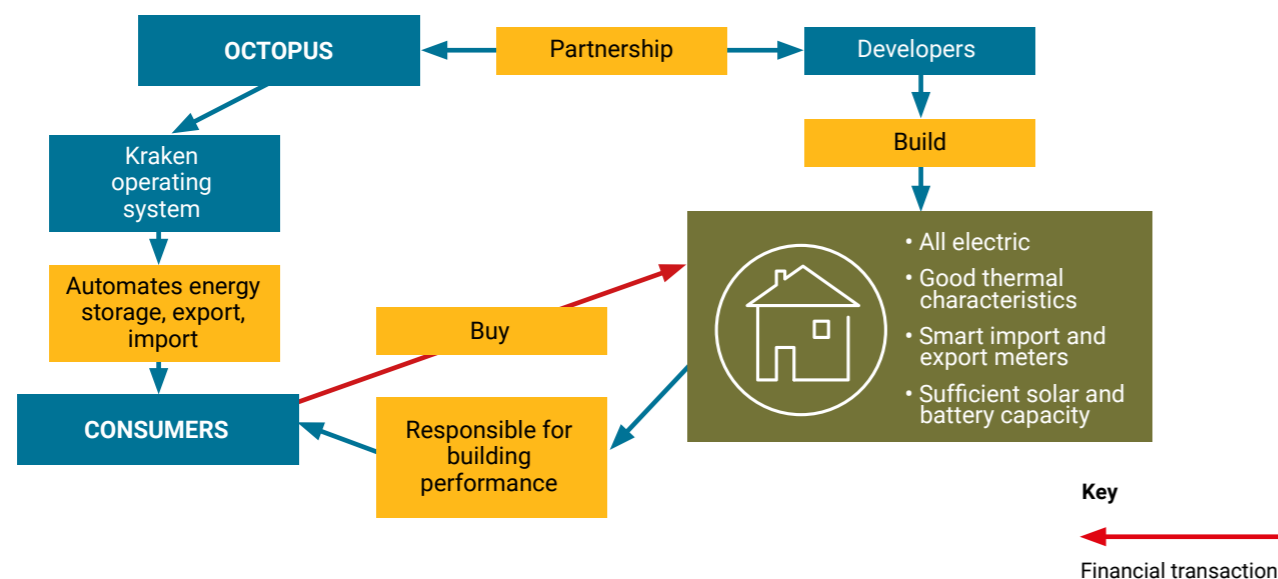
1. Overview

The Octopus Zero Bill Homes scheme guarantees no bills for five years, provided the consumer's home meets efficiency standards and is fully electrified.

This means consumer benefit from the "stack" without any action. In 2019, 19% of the UK's carbon emissions came from heating homes.⁶³ The UK has one of the least efficient building stocks in Europe and over three million households met the criteria for fuel poverty in 2022.⁶⁴

Octopus partners with housing developers for new buildings to enter the market with specifications that make them eligible for Zero Bills. Owners or tenants benefit from five years during which they do not pay for energy, provided the building continues meeting these criteria. Those include complete electrification, sufficient solar and battery capacity, high thermal standards, as well as reliable broadband connection and smart import and export meters.⁶⁵

2. The ZERO BILL HOMES model for new builds



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- The benefits of the Zero Bills homes are automatic: when consumers move into their new home, the Kraken smart meter and system optimises and integrates the different elements of the energy system. The consumer is passive but aware during this optimisation.

- Collaboration with banks to provide dedicated green finance products that make these homes affordable is key.
- From a technical perspective, the design of roofs is fundamental to maximise solar output. The automatic optimisation by Kraken holds this scheme together.

⁶³ United Kingdom. Business, Energy and Industrial Strategy Committee (2021). *Decarbonising heat in homes*. Available at: <https://publications.parliament.uk/pa/cm5802/cmselect/cmbeis/1038/report.html>

⁶⁴ United Kingdom. Department for Energy Security and Net Zero (2023). *Annual Fuel Poverty Statistics LILEE Report 2023*. Available at: <https://assets.publishing>

[service.gov.uk/government/uploads/system/uploads/attachment_data/file/1139133/annual-fuel-poverty-statistics-lilee-report-2023-2022-data.pdf](https://www.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1139133/annual-fuel-poverty-statistics-lilee-report-2023-2022-data.pdf)

⁶⁵ Fletcher, E (2023). *Octopus Zero Bills: Harnessing technology to drive decarbonisation and affordability in housing*

⁶⁶ *ibid*

REPOSIT POWER, AUSTRALIA: INTEGRATED ENERGY SUPPLY

Automated solar and storage systems that provide grid services, guaranteeing 7 years of zero bills for consumers.

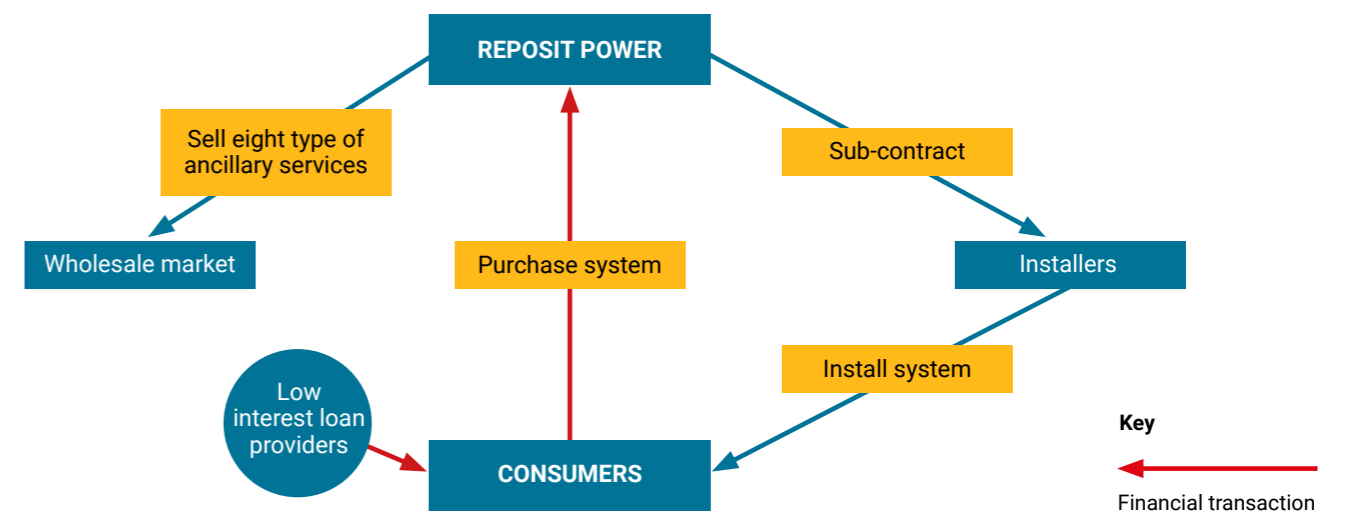
1. Overview

Households who are considering installing solar panels in Australia might do it as insurance against rising electricity costs. However, the process is expensive, and consumers tend to not trust the system's quality, reliability, and performance given the financial burden.

Reposit addresses this issue by providing households a guarantee of seven years without electricity bills. In the background, they leverage the network of residential solar and storage systems to contribute to grid reliability by trading in ancillary services and other markets.

They ensure the home energy technologies are well integrated thanks to smart controller working to optimise the consumer's system without relying on cloud transfers.

2. The REPOSIT POWER model



3. Consumer journey



4. Benefits

Streamlining of consumer journey

- Reposit is vertically integrated: they plan, install, integrate, and optimise systems on consumers' behalf and according to their energy needs.
- Consumers benefit from a simple proposition where they have no electricity bill for seven years.
- The automated controller streamlines the consumer experience, as it optimises energy flows with little input from households. By not using a cloud intermediary, Reposit ensures that the smart automation is quicker, more reliable, and accurate even during Internet cuts.

Contribution to consumer trust

- Due to the no bill guarantee for several years, there is an alignment of consumer and provider interests, since Reposit will only recoup costs if the system is working effectively. This means Reposit chooses high-quality, reliable equipment, and helps the consumer with maintenance and addresses technical problems.
- If there is unusually high electricity use, Reposit is quickly informed thanks to live data sharing and can address the underlying issue.
- Reposit is responsible for setting up the home energy system and integrating elements from different manufacturers, removing the risk of interoperability issues for consumers.

Factors impacting affordability

- Consumers do not pay electricity bills for seven years, so Reposit acts as a guarantee against rising electricity costs.
- Depending on their typical electricity bills and green loan, consumers can save up to 25,000A\$ by the end of the seven-year contract.

5. Impact achieved

Reposit solar panels have an aggregate capacity of 110MW through 6,000 installations and have provided an estimated 35GWh of ancillary service since 2019.

6. Key enablers

- Data is at the core of Reposit's success. Tens of data points are recorded every second which enables the optimisation and automation of the systems. This allows Reposit to unlock revenues from 15 different electricity markets, including trading on the wholesale market and providing frequency response to eight ancillary services markets.
- Alignment of incentives post-installation: both consumers and Reposit have an interest in keeping the systems running efficiently.

APPENDIX 3: CASE STUDY INFORMATION SHEETS

KLIMA AGENCE ^{67 68}

Country	Luxembourg
Geographical coverage	Luxembourg
Host	n/a
Status	Running
Timeframe	Founded in 2008 / Operational since 2009
Operational details	Mature
Key selling point	Free impartial energy advice for citizens for a wide range of home energy technologies
Main goals	Help consumers renovate, decrease energy use, use cleaner sources of energy and technologies, promotion of e-mobility
Channels for consumer contact	Online, telephone, in person
Target beneficiaries	Luxembourg citizens, municipalities, professional stakeholders
Legal status	Public agency
Main source of financing	Public funding
Partners and contractors	Ministries of Housing, Energy and Environment, Order of Architects and Consulting Engineers architects, Chamber of Craftsmen
General education and awareness – including financial advice	Yes – general awareness and education (including national campaigns), and tailored advice to households
TOPICS COVERED:	
Financial services	Calculators and links for grants and subsidies
Building efficiency improvements	Yes
Photovoltaic panels	Yes
Efficient or clean heating or cooling	Yes
Electric vehicle charging	Yes
Export tariff	No
Flexibility tariff	In preparation
Battery storage	Yes
Equity and energy poverty	Yes – in 2017 they launched an advisory service tailored to households in energy poverty
Smart meter	Yes
Smart home energy management or automated load	Yes (basic level)
Guaranteed returns or savings	No

UPLIGHT ONLINE UTILITY MARKETPLACE

Country	USA
Geographical coverage	USA
Host	n/a
Status	running
Timeframe	Acquisition of Tendril and Simpler Energy in 2019 ⁶⁹
Operational details	Established
Key selling point	Uplight uses data and behavioural insights to help utilities engage consumers to expand the energy-related goods and services they purchase, such as demand response and smart devices
Main goals	Engage consumers for more energy efficiency

⁶⁷ Faber, F (2023). Interviewed by Morgane Mayoux. 19 October, online

⁶⁸ Klima Agence website. Available at: <https://www.klima-agence.lu/en>

⁶⁹ Crunchbase. (2022). Available at: https://www.crunchbase.com/organization/uplight/company_overview/overview_timeline

Channels for consumer contact	Personalised emails, letters, notifications, texts
Target beneficiaries	Utility customers
Legal status	Private company
Main source of financing	Private equity
General education and awareness – including financial advice	Yes – consumer engagement includes sending tailored information on energy saving
TOPICS COVERED:	
Financial services	No
Building efficiency improvements	No
Photovoltaic panels	Yes
Efficient or clean heating or cooling	Yes
Electric vehicle charging	Yes
Export tariff	Yes
Flexibility tariff	Yes
Battery storage	Yes
Equity and energy poverty	No
Smart meter	Yes
Smart home energy management or automated load	Yes
Guaranteed returns or savings	No

CYPRUS CONSUMERS' ASSOCIATION (CCA) COLLECTIVE PURCHASE CAMPAIGNS ^{70 71 72}

Country	Cyprus
Geographical coverage	Cyprus
Host organisation	CCA and CLEAR-X consortium
Status	Closed
Timeframe	2021-2024
Operational details	Replicating
Key selling point	Collective purchasing campaigns of solar panels and efficient air conditioning
Main goals	Reduce cost of clean energy technologies for consumers
Channels for consumer contact	Marketing through press conferences and national news outlets
Target beneficiaries	Households
Legal status	Not for profit
Main source of financing	EU (Horizon 2020)
Partners and contractors	CLEAR-X consortium (national consumer organisations, BEUC and International Consumer Research & Testing), local installers
General education and awareness – including financial advice	Website and call centre during campaign, general information on energy savings online
TOPICS COVERED:	
Financial services	No
Building efficiency improvements	Information and advice on energy saving
Photovoltaic panels	Yes- the price is negotiated for consumers and the technology is tested
Efficient or clean heating or cooling	Yes- separate campaign for efficient air conditioning
Electric vehicle charging	No
Export tariff	Net metering and virtual metering available in Cyprus
Flexibility tariff	No
Battery storage	No
Equity and energy poverty	No - Cyprus has grants and subsidies, but consumer is responsible for upfront financing

⁷⁰ CLEAR-X website. Available at: <https://www.clear-x.eu/>

⁷¹ Rossides, S (2023). Interviewed by Morgane Mayoux. 2 October, online.

⁷² Cyprus. Ministry of Energy, Commerce and Industry (2022). *Scheme for the Production of Electricity from Renewable Energy Sources for Own Consumption (the Scheme)* (Amendment of an existing support scheme). Available at: <https://meci.gov.cy/en/useful-information/announcements/391/?ctype=ar>

Smart meter	No
Smart home energy management or automated load	No
Guaranteed returns or savings	No – but an online calculator estimates savings beforehand

SLOVENE CONSUMERS' ASSOCIATION COLLECTIVE PURCHASING CAMPAIGN FOR CLEAN TECHNOLOGIES ⁷³

Country	Slovenia
Geographical coverage	Slovenia
Host organisation	Slovene Consumers' Association and CLEAR-X consortium
Status	Closed
Timeframe	2022
Operational details	Replicating
Key selling point	Have consumers on board: collective purchasing campaigns of heat pump tumble drier and air conditioning
Main goals	Reduce cost of efficient energy technologies for consumers
Channels for consumer contact	Marketing through press conferences and national news outlets
Target beneficiaries	Homeowners
Legal status	Not for profit
Main source of financing	EU (Horizon 2020)
Partners and contractors	CLEAR-X consortium (national consumer organisations, BEUC and International Consumer Research & Testing), local installers
General education and awareness – including financial advice	Website with articles on energy saving; call centre for help during campaign
TOPICS COVERED:	
Financial services	No
Building efficiency improvements	Information and advice on energy saving
Photovoltaic panels	No
Efficient or clean heating or cooling	Yes- efficient air conditioning and heat pump tumble drier
Electric vehicle charging	No
Export tariff	No
Flexibility tariff	No
Battery storage	No
Equity and energy poverty	No
Smart meter	No
Smart home energy management or automated load	No
Guaranteed returns or savings	No – but an online calculator estimates savings beforehand

ENACT ⁷⁴

Country	International – headquartered in USA and launched in United Arab Emirates (UAE)
Geographical coverage	20+ countries including UAE, India, Philippines, Singapore, United States, Germany, South Africa
Host	n/a
Status	running
Timeframe	Launched in 2015, software launched in 2018
Operational details	Mature

⁷³Klemenčič, P. (2023). Interviewed by Morgane Mayoux. 9 October, online.

⁷⁴Chakraborty, D. (2023), interviewed by Oliver Bealby-Wright. 23 October, online.

Key selling point	Improving transparency and predictability in price and saving outcomes. Helping to select installer, brand and financing options
Main goals	Work with the entire energy ecosystem to offer a digital platform for residential and commercial energy systems installation and monitoring. Using Google Satellites, they design the system and predict associated cost and savings
Channels for consumer contact	Online platform, telephone number, app
Target beneficiaries	Homeowners and commercial clients
Legal status	Private company
Main source of financing	Equity
Partners and contractors	Installers, utilities, financiers, original equipment manufacturers (OEM), homebuilders, real estate companies, EV businesses, companies whose employees are looking to install solar systems
General education and awareness – including financial advice	No
TOPICS COVERED:	
Financial services	Yes
Building efficiency improvements	No
Photovoltaic panels	Yes
Efficient or clean heating or cooling	Yes – recently launched services for heat pumps in Germany
Electric vehicle charging	Yes
Export tariff	No
Flexibility tariff	No
Battery storage	Yes
Equity and energy poverty	No
Smart meter	Yes
Smart home energy management or automated load	Yes
Guaranteed returns or savings	Yes

REPUBLIC OF IRELAND ^{75 76}

Country	Ireland
Geographical coverage	Ireland
Host	Sustainable Energy Authority of Ireland (SEAI)
Status	Running
Timeframe	Launched in February 2022
Operational details	Established
Key selling point	Grants and certification of providers of home energy upgrades
Main goals	Reducing energy use and switching to clean energy technologies
Channels for consumer contact	Ads on radio, TV, newspapers, social media. Community based social marketing. Events. Targeted campaigns. Campaigns led by One Stop Shops
Target beneficiaries	Homeowners and approved housing bodies
Legal status	Public body
Main source of financing	Government funding
Partners and contractors	Local or national contractors
General education and awareness – including financial advice	Yes- communication campaigns, website
Financial services	Yes – grants available for wide range of energy upgrades areas including insulation, heat pumps, solar panels
Building efficiency improvements	Yes

⁷⁵Sustainable Energy Authority of Ireland website. Available at: <https://www.seai.ie/grants/home-energy-grants/one-stop-shop/>

⁷⁶Williams, S. (2023). Interviewed by Oliver Bealby-Wright. 9 October, online.

Photovoltaic panels	Yes
Efficient or clean heating or cooling	Yes
Electric vehicle charging	Yes, just not available in the OSS package. EV charger grants are available from SEAI and many One Stop Shops will administer for clients
Export tariff	Available from electricity provider to homeowners with solar PV
Flexibility tariff	No
Battery storage	Yes, depending on project scope
Equity and energy poverty	Different schemes are available for lower income households
Smart meter	Yes, depending on project scope and contractor
Smart home energy management or automated load	No
Guaranteed returns or savings	The project outcome needs to attain B2 to be eligible for a grant

ROCASOL ⁷⁷

Country	Colombia
Geographical coverage	Colombia
Host	n/a
Status	Running
Timeframe	The current business model was launched in January 2022
Operational details	Replicating
Key selling point	Links up financiers and installers of solar panel systems
Main goals	Make consumers save on energy bills by offering financing options for solar panels
Channels for consumer contact	Most clients are brought by partner financial institutions or installers, and Rocasol hosts an online platform where installers and clients communicate
Target beneficiaries	Homeowners and businesses
Legal status	Private company
Main source of financing	Private Equity
Partners and contractors	Banco de Bogotá, 15 installers, distributors of solar equipment, electricity transmission companies
General education and awareness – including financial advice	No
TOPICS COVERED:	
Financial services	Yes – coordination with financial institution and offer different options according to consumer's need
Building efficiency improvements	No
Photovoltaic panels	Yes
Efficient or clean heating or cooling	No
Electric vehicle charging	No
Export tariff	Yes – households can export electricity to the grid which provides a significant incentive
Flexibility tariff	No
Battery storage	No
Equity and energy poverty	The model's aim is to provide consumers with a trustworthy and affordable deal for solar home systems
Smart meter	No
Smart home energy management or automated load	No
Guaranteed returns or savings	No – but estimations of savings are provided to consumers beforehand

⁷⁷ Rodriguez, S (2023). Interviewed by Morgane Mayoux. 18 October 2023, online

⁷⁸ Gogla (2023). Case Study- Zuwa Energy. Available at: <https://www.gogla.org/reports/doubling-collection-rates-case-study-zuwa-energy/>

⁷⁹ Ntaukira, J (2023). Interviewed by Oliver Bealby-Wright. 18 October, online

ZUWA ENERGY ^{78 79}

Country	Malawi
Geographical coverage	Malawi
Host	n/a
Status	running
Timeframe	Since 2016
Operational details	Established
Key selling point	Social enterprise for off-grid solar
Main goals	Provide asset financing for off-grid solar energy and appliances with PAYGO payment system
Channels for consumer contact	Zuwa shops; Zuwa community agents; customer care number; text message to call back
Target beneficiaries	Off-grid, low-income communities and entrepreneurs
Legal status	Private limited company
Main source of financing	Equity, debt and grants
Partners and contractors	n/a
General education and awareness-including financial advice	Pre-purchase: focus on raising awareness about benefits of solar, how it works, sharing success stories Product demonstration in markets and village Rural 'Role Models' to sample products (eg. Head Teacher of local primary school) Purchase: consumer is trained on how to use and take care of the product. Educational stickers: 'how to pay with mobile money'; 'how to enter your token'; 'learn about our buy-back policy' are stuck on the product as future reference for the customer. Post purchase: Agents are first automatic point of contact for customers Customer Service Team calls to prevent technical or payment issues before they arise
TOPICS COVERED:	
Financial services	Yes – PAYGO system and flexibility in payment schedule. Software platform to check prospective customer's ability to pay before they are onboarded
Building efficiency improvements	No
Photovoltaic panels	Yes
Efficient or clean heating or cooling	Yes
Electric vehicle charging	No
Export tariff	No
Flexibility tariff	No
Battery storage	Yes
Equity and energy poverty	Yes- Zuwa's consumer base is low-income
Smart meter	Yes (for microgrids)
Smart home energy management or automated load	No
Guaranteed returns or savings	No

WETILITY ⁸⁰

Country	South Africa
Geographical coverage	South Africa
Host	n/a
Status	Running
Timeframe	Founded in 2019, and recent "Beast bundle" product launched in 2023
Operational details	Established
Key selling point	Create convenience: consumers save on energy bills and access power continuously despite unreliable grid as soon as solar system is operational.

⁸⁰ Oguguo, I. (2023). Interviewed by Morgane Mayoux. 20 October, online.

Main goals	Energy independence for everyone through affordable solar as a service
Channels for consumer contact	App, customer service number
Target beneficiaries	Homeowners
Legal status	Private company
Main source of financing	Equity and debt
Partners and contractors	Installers, technology suppliers
General education and awareness – including financial advice	No
TOPICS COVERED:	
Financial services	Yes – leasing model where consumers pay a monthly fee and they usually do not pay upfront
Building efficiency improvements	No
Efficient or clean heating or cooling	Yes
Electric vehicle charging	No
Export tariff	No
Flexibility tariff	No – but smart geysers optimise energy storage and use
Battery storage	Yes – a hybrid inverter is provided and battery storage protects against power outages
Equity and energy poverty	Yes - products tailored to consumer needs and financial capacities
Smart meter	Yes – consumers can track energy from their solar panels and the grid on a dedicated app and also have a smart meter and grid meter
Smart home energy management or automated load	Yes – more recent bundles include smart geysers that optimise energy storage and use
Guaranteed returns or savings	No

BARRIO ELÉCTRICO ⁸¹

Country	Puerto Rico
Geographical coverage	Puerto Rico
Host	n/a
Status	Running
Timeframe	Founded in 2017
Operational details	Replicating
Key selling point	Affordable solar as a service with no upfront cost
Main goals	Offer solar and battery systems to low and moderate-income households in Puerto Rico to offer resilience to natural disasters and unreliable grid
Channels for consumer contact	Community workshops and agents, website, telephone number, roundtables, social media
Target beneficiaries	Low and moderate-income households
Legal status	NGO that controls investment vehicle
Main source of financing	Impact investors, federal incentives
Partners and contractors	Installation companies, electricians and handymen, cooperative banks, municipalities, community groups, other local NGOs
General education and awareness – including financial advice	Yes – there are community workshops on energy systems and the benefits of solar energy
TOPICS COVERED:	
Financial services	Indirect - Households - Households with financial need are assisted with obtaining grants if the house needs repairs to enable installation of the solar system
Building efficiency improvements	Indirect - Households are directed to relevant contractors to carry out works before installing solar system; households with financial need are assisted with obtaining grants for energy efficiency and conservation upgrades
Photovoltaic panels	Yes
Efficient or clean heating or cooling	No

⁸¹ Rosenblatt, L. (2023). Interviewed by Oliver Bealby-Wright. 2 November, online.

⁸² Fletcher, E. (2023) Interviewed by Oliver Bealby-Wright. 7 November, online

⁸³ Fletcher, E. (2023) *Octopus Zero Bills: Harnessing technology to drive decarbonisation and affordability in housing* – Emma Fletcher

Electric vehicle charging	No
Export tariff	Possible, but net metering is not very beneficial
Flexibility tariff	No
Battery storage	Yes
Equity and energy poverty	Yes- targets are low and moderate-income
Smart meter	No
Smart home energy management or automated load	Yes
Guaranteed returns or savings	No

OCTOPUS ZERO BILLS TARIFF ^{82 83}

Country	United Kingdom
Geographical coverage	United Kingdom, with plans to export model abroad
Host	Octopus Energy
Status	Running
Timeframe	Scheme with new builds in 2022 (Essex) Goal of 10,000 'Zero Bills' homes by 2025
Operational details	Replicating
Key selling point	Zero energy bills for five years for residents of homes meeting certain standard for efficiency and electrification
Main goals	Export surplus solar generation to guarantee no bills
Channels for consumer contact	Through developers for new builds or existing customers
Target beneficiaries	Homeowners or tenants with certain building specifications
Legal status	n/a
Main source of financing	n/a
Partners and contractors	House builders, housing associations, developers, surveyors, mortgage companies, landowners
General education and awareness – including financial advice	No
TOPICS COVERED:	
Financial services	No
Building efficiency improvements	High thermal specifications required
Photovoltaic panels	Required
Efficient or clean heating or cooling	Electrification required
Electric vehicle charging	Not yet
Export tariff	Zero bill tariff
Flexibility tariff	Zero bill tariff
Battery storage	Yes
Equity and energy poverty	No
Smart meter	Required
Smart home energy management or automated load	Yes- Octopus' Kraken platform optimises home battery and heat pump on-site
Guaranteed returns or savings	Yes – zero bills for five years

REPOSIT POWER

Country	Australia
Geographical coverage	Australia
Host	n/a
Status	Running

⁸⁴ Spaccavento D. (2023) Interviewed by Oliver Bealby-Wright and Morgane Mayoux. 3 November, online

Timeframe	Founded in 2015
Operational details	Established
Key selling point	No electricity bills guaranteed for seven years: eliminate risks and uncertainty for consumers who want solar energy
Main goals	Act as a guarantee for consumers who install solar panels –manage energy flows, and offer ancillary services to wholesale market
Channels for consumer contact	App, customer service, web page, google ads
Target beneficiaries	Middle-income homeowners
Legal status	Private company
Main source of financing	Private equity, grants
Partners and contractors	Solar installers, providers of green finance for households, utilities, manufacturers of clean energy technologies
General education and awareness – including financial advice	Yes – online blog and explanation of benefits to prospective customers
TOPICS COVERED:	
Financial services	Yes - link up with beneficial financing options
Building efficiency improvements	No
Photovoltaic panels	Yes
Efficient or clean heating or cooling	No
Electric vehicle charging	Yes
Export tariff	Yes
Flexibility tariff	Yes
Battery storage	Yes
Equity and energy poverty	No bills for seven years
Smart meter	Yes
Smart home energy management or automated load	Yes – local smart automation, even without an Internet connection
Guaranteed returns or savings	Yes – seven years guarantee and a 10-year warranty on hardware



**CONSUMERS
INTERNATIONAL**

COMING TOGETHER
FOR CHANGE

Consumers International brings together over 200 member organisations in more than 100 countries to empower and champion the rights of consumers everywhere. We are their voice in international policy-making forums and the global marketplace to ensure they are treated safely, fairly and honestly.

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